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LOGIC:

DESIGNED AS AN INTRODUCTION

TO THE

STUDY OF REASONING.

BY THE

REV. JOHN LEECHMAN, M.A., LL.D.,

GLASG. UNIV.

Fourth Edition,

ILLUSTRATED BY DIAGRAMS, WITH COPIOUS EXERCISES
FOR PRACTICE.

LONDON:

WILLIAM ALLAN & CO., STATIONERS' HALL COURT.

1864.

PREFACE TO THE SECOND EDITION.

———

THE subject of the following work is confessedly un-popular. It has been selected, however, not merely from personal predilection, but from a conviction of its utility. The misconceptions and prejudices that prevail respecting Logic are too deeply rooted to be easily or speedily eradi-cated; but were the Science known in its true principles and application, it could not fail to obtain a prominent place in every system of liberal education. It is not only recommended by its venerable antiquity, and the uni-versal dominion which it once exercised over the learned world; but it is intimately connected with the philosophy of language, and the philosophy of the human mind; it forms and cultivates some of our most valuable mental habits; and its intimate relation to daily practice can scarcely be denied.

Elementary works on Logic are not easily procurable; and those that are most common are calculated rather to bewilder than to direct the youthful student. To remedy this evil is the object of the following treatise. It is intended as a convenient introduction to this branch of

knowledge, and is more particularly suited for those who are entering on the study of Mental Philosophy. It traces the history of the Science of Reasoning from the earliest period to the present time; it unfolds its fundamental principles and rules, accompanied with appropriate illustrations; and points out, at considerable length, its application to practical purposes. The limits of the work rendered it necessary that brevity should be, as much as possible, studied. It is hoped, however, that nothing really essential to the subject has been overlooked.

In compiling this work, the Author has availed himself most freely of the labours of his predécessors. He has consulted several Compendiums of Aristotle's Logic, which are used as Class-Books in the Universities of Europe. He has taken without scruple from the works of Bacon, Campbell, Reid, Stewart, Jardine, Duncan, and other writers on Logic and Mental Science, whatever appeared most suitable to his purpose. To the admirable work of Dr Whately, he acknowledges, in a particular manner, his obligations. The Author begs leave gratefully to record the very courteous manner in which, in preparing this Second Edition for the press, the Archbishop has permitted him to make the freest use of his Grace's invaluable labours. He has, therefore, most gladly availed himself of this generous permission. This has been the case particularly in the Chapter on Fallacies, which the Archbishop has discussed with uncommon ability.

When turning to profit the help of others, the Author

has thought it unnecessary to point out, in every instance, the sources whence he has derived his information. In many cases this would have been impossible, as the truths brought forward have been so long familiar to the mind, that the sources whence they were originally derived have been forgotten. In any case to have brought forward authorities would have been of no service. What has once been communicated to the world has become public property; and it is only with regard to new or debatable opinions in literary and scientific matters that authorities are of any value. The language of an able writer, in reference to another department of science, may be applied to the subject now before us: "The advanced state of a science is but the accumulation of the discoveries and inventions of many; to refer each of these to its author is the business of the history of the science, but does not belong to a work which professes merely to give an account of the science as it is; all that is generally acknowledged must pass current from author to author." *

This Second Edition has been carefully revised, and considerably enlarged;—it is hoped it may furnish such an Introduction to this study as has hitherto been wanting.

* Brett's " Principles of Astronomy," p. v.

IRVINE, 14th October 1844.
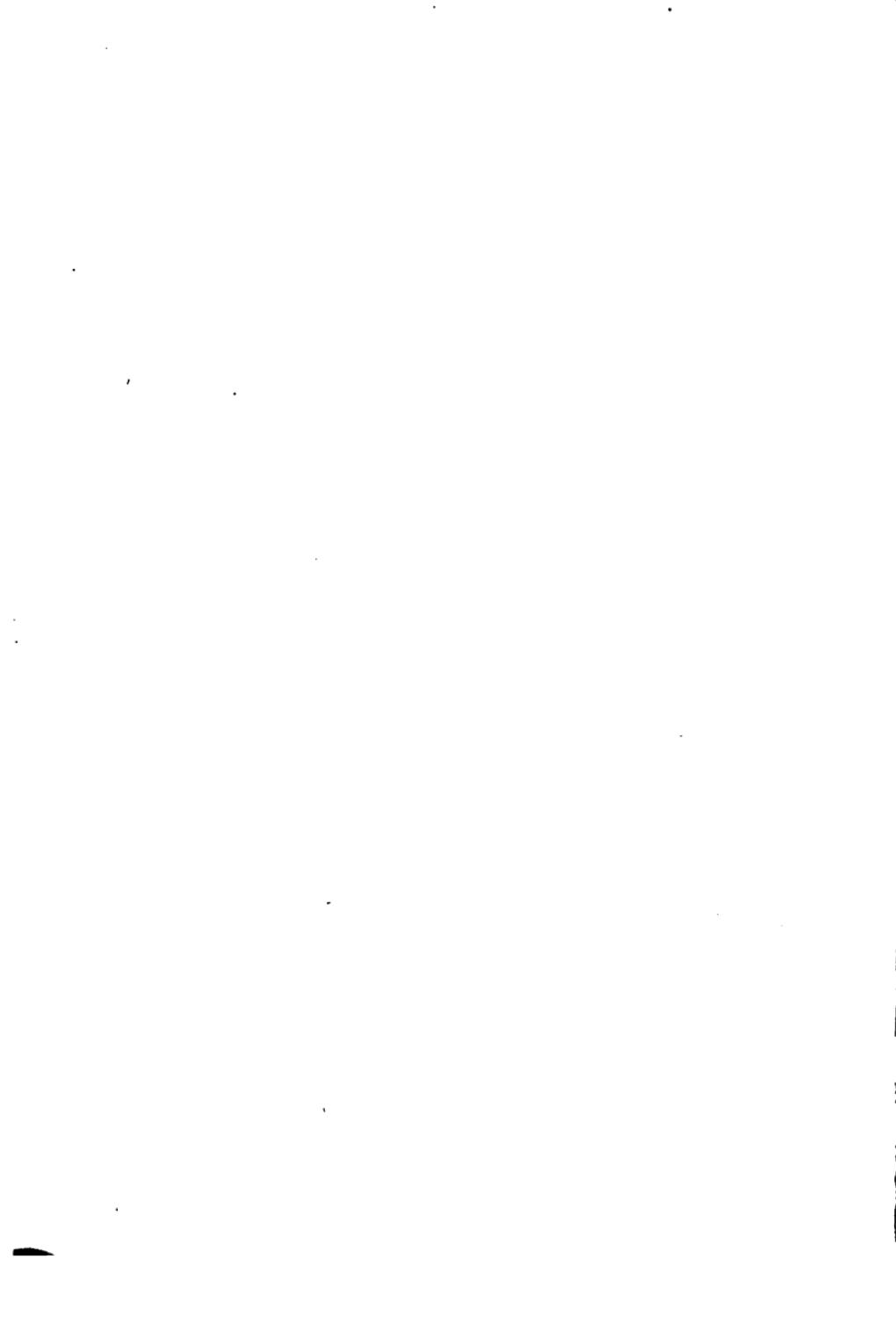
ADVERTISEMENT TO THE THIRD EDITION.

As proficiency in the study of Logic can scarcely be attained without a practical acquaintance with its rules, there has been added in this Edition, besides numerous Miscellaneous Examples for practice, a Progressive Series of Exercises, embracing all the important parts of the subject. This addition, the Author ventures to hope, will render the work still more suitable for our higher Seminaries of learning, as well as for those who may wish to prosecute the study in private.

November 1846.

ADVERTISEMENT TO THE FOURTH EDITION.

THE Author is gratified that the demand for this work still continues. Logic is a favourite branch of Study in our days. Prejudices respecting it have passed away; its value as an important branch of Education is now admitted; and many master minds are leading the thoughtful, with increasing profit and pleasure, into its loftier and more abstruse developments. Still, for the young at least, an Elementary Treatise is necesssry. To meet this want in our first-class schools is the object kept constantly in view in this volume. It is at once simple and comprehensive. In addition to the numerous Examples and Exercises in former Editions, Diagrams have been introduced which represent the argument to the eye as in Euclid. The advantage of this must be obvious to all.

BATH, *August* 1864.

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LOGIC.

INTRODUCTION.

No branch of study has suffered so much from perversion and neglect as Logic. To form just views of its nature and object, and to rectify the mistakes that prevail respecting it, is therefore the first thing that demands attention.

The term Logic is derived from a Greek word, (λογος,) which, among other meanings, signifies *reason*. This term, however, is ambiguous. It may denote either " Reason," comprising all those intellectual powers of man on which his claim to rationality is founded ;—or it may mean " *a* reason," in the sense of an argument, or proof, to establish a point at issue ;—or it may signify " Reason*ing*," that process by which we draw an inference from facts or opinions previously known and admitted. Hence it has happened that the name Logic, at different times, has assumed a signification more or less extended, according to the views of the different writers by whom it is employed. Some have used it as including *all* the operations of the Human Intellect, as if it were intended to teach us " the right use of Reason ;" while by others it is restricted to the apparently simple but important act of drawing a conclusion from given premises; or of deducting from truths already admitted, another truth, in which it is thus shewn to be involved.

This diversity in the application of the term has, as a matter of course, given rise to much confusion and controversy. Not only the name, but the nature and object of the study have

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beerl misunderstood and misrepresented ; and very serious
mistakes, and much mischief, have been the consequence.
Writers on Logic, not having clearly defined its peculiar pro-
vince, or discriminated it from other departments of knowledge,
have extended its limits beyond all reasonable bounds ; and
many, perceiving its utter inability to accomplish what its fond
votaries promise, have therefore consigned it to contempt or
oblivion.   We beg leave to state distinctly at the outset, that
in this treatise we bring forward no such vain, though high-
sounding, pretensions.   We profess not to lay down rules for
thinking on all topics with precision and accuracy ; or for
forming a correct judgment on all occasions, and on all sub-
jects ; or for opening up a royal road to the acquisition of all
truth.   Such promises can only lead to disappointment.   We
restrict the name and the province of Logic to that operation
of the mind by which we infer one truth from certain other
truths ; or by which we proceed, from certain statements pre-
viously admitted, to another statement resulting from them,
or on which it is founded.   The proper business of Logic is
simply *Reasoning*, or *Argumentation*.

By Reasoning, in the sense in which it is here used, we
understand all the elements of which it is composed.   In
every act of reasoning a conclusion is drawn from *premises ;*
these premises are made up of *propositions;* and propositions
are formed of *terms*.   Each of these is a constituent part of an
Argument ; hence they all fall within the province of Logic.

In reference to the terms of which propositions consist,
and even to the propositions themselves, it is scarcely neces-
sary to observe that they do not constitute *reasoning*.   For
instance, " man," " Buonaparte," " ambitious," " miserable,"
are *terms*.   Again, " Buonaparte was a miserable man ; "
" Buonaparte was an ambitious man ;" these are *propositions*.
But not one of these contains an act of reasoning.   Neither
the terms themselves, nor the collocation of the terms in simple
propositions, however modified or arranged, can be so desig-
nated.   There must be a certain connexion existing and ex-
pressed between the propositions that form an argument.
There must be an act of the mind comparing these proposi-
tions ; evolving what they virtually contain ; and drawing an
inference or conclusion from them such as they warrant.

Every argument, therefore, consists of two parts :—that which is proved, and that by means of which the proof is established. It is of no consequence to the validity of an act of reasoning which of these parts is first stated. Sometimes that which is to be proved is laid down first, and then the reason or proof follows. At other times the proof is first given, and then the inference is drawn. In all cases, however, the conclusion, whether stated first or last, may be easily known by those connecting particles, "therefore," "consequently," "since," "because," or their equivalents ; and where these conjunctions cannot with propriety be used, whatever the number, or order, or meaning of the terms and propositions may be, there is no Argument.

It is a mistake to suppose that Reasoning, or the use of Arguments, is confined only or chiefly to disputation. Mathematicians are constantly engaged in reasoning ; but they establish their propositions by proofs so exact as to preclude even the possibility of controversy. We are all occupied, more or less, in giving Reasons for our opinions ; in drawing Conclusions from what we learn or know ; in supporting these conclusions by some kind of Proof ; and in answering the Objections that may be brought against us. These forms of expression, and others of a similar import, have all a reference to Reasoning ; and it is the province of Logic to teach us how to proceed so as to reason conclusively, and to express ourselves, in this important work, with clearness and accuracy.

It is, however, the reasoning process, the principles on which it is founded, and the laws by which it is regulated, that form the proper object of Logic. To analyse the mental powers employed in reasoning, and to investigate their various phenomena, belong to the Metaphysician. It is only so far as they are subject to the laws of Reasoning that they claim the attention of the Logician. It is his office to analyse the principles on which argumentation is founded, and to lay down rules to guide and guard us in this matter of constant, universal, and primary importance. Logic is chiefly occupied with the laws of thought, restricted as above. But as language is the vehicle of thought, it must also necessarily, in some degree, take cognisance of the medium of communication. This, however, may be viewed as only a secondary object. It

is because language expresses the thoughts with which Logic is more immediately concerned, that it comes under its notice. The philosophy of language belongs to the Grammarian and Rhetorician.

It is of importance to observe that in every act of reasoning, whatever the subject-matter may be, the process itself is universally the same. Whether it relate to religion, law, or politics; to literature or science; to mind or to matter; to subjects the most distinct and dissimilar,—in so far as you are, in the proper sense of the word, *Reasoning,* and that correctly conducted, the process is, in all cases, one and the same. As in Arithmetic the process is the same, whether the calculation be respecting certain numbers of men, or of pieces of money, or of miles; and as in Grammar the process is the same, whether the work you are *parsing* treats of History or Poetry, of Chemistry or Divinity; so is it, in every case, with the process of Reasoning. Whenever we employ an argument, we merely infer one thing from certain other things; we draw an inference from certain facts or statements already admitted, or taken for granted. That from which our inference is drawn we denominate the *Premises,* because, in their natural order, they are " premised," or laid down first; the inference we call the *Conclusion,* because it is " concluded " or " proved " by the argument. Thus, for instance, when the barometer is rising we infer the existence of drought; or, in the morning when " the sky is red and lowering," we infer that it will be rain. In each case the former assertion is the *premise,* and the latter the *conclusion.*

It might appear, from these examples, that a conclusion may be drawn from *one* premise only, since only one is here *expressed,* and since this is the usual form in which an argument is stated. But a little reflection will shew that there is a premise *understood,* which, if denied, will at once destroy the validity of the argument. When, from the rising of the barometer, we infer the existence of drought, we have in our mind this other premise, " whenever the barometer rises, drought is existing." If this general proposition, in the suppressed premise, be denied, the particular instance, in the expressed premise, is not proved; if both are admitted, the conclusion is inevitable.

Again ; if we say, " Buonaparte was ambitious, *therefore* he was miserable ; " we conclude that, because ambition existed in the mind of the French Emperor, misery must have existed there likewise. If this argument be objected to, it must either be because the *assertion* made is denied, or the *inference* drawn from it is questioned. An opponent may answer, " I deny what you assert, that Buonaparte *was* ambitious ; " or, " I admit that Buonaparte was ambitious, but I deny that it *proves* your conclusion." In the one case the objection lies against the *expressed* premise, which must therefore itself first be proved and admitted before the argument be conclusive ; in the other it is the *suppressed* premise that is denied —namely, " all ambitious men are miserable ; " since, if this be granted, and the ambition of Buonaparte be admitted, the conclusion drawn is irresistible. It thus appears that in every argument we must have *data* on which to proceed. Our premises, whether expressed or understood, must be admitted and acknowledged. If either be denied, the proof fails. If both be granted, the inference regularly drawn from them can neither be doubted nor denied.

In every case, then, an act of reasoning is the mental operation of inferring one statement from certain others ; of viewing one fact as necessarily connected with, involved in, and deduced from, some other facts, previously ascertained and acknowledged. When an act of reasoning is stated at full length, and in its regular order, it consists of *three* propositions, the two premises and the conclusion ; and then it is called a *Syllogism.* Thus :—

> All ambitious men are miserable :
> Buonaparte was an ambitious man ;
>   therefore,
> Buonaparte was miserable.

To this form all correct reasoning may be reduced, and thus its validity can be established, whatever be the subject-matter of discussion. The soundness of an argument, however, be it particularly remembered, does not depend on our perceiving the *meaning* of the terms, or the *truth* of the propositions, which we thus employ. It may be expressed in intelligible language, or in terms not clearly apprehended, or

utterly unintelligible ; the premises may be manifestly false
and absurd, or they may be mere arbitrary symbols which
have, in themselves, no meaning at all, or any meaning that
you may choose to attach to them : still, if they be granted,
and the inference be legitimately drawn, the conclusion *follows*
as a matter of course.   In the above example we have an
argument stated in language that cannot be misunderstood ;
and it is clearly impossible for a person to admit the pre-
mises and deny the conclusion.

Take another example, in which the terms may be obscure,
or unintelligible :—

> All acidulous mineral water abounds in carbonic
>   acid :
> This liquid is acidulous mineral water ;
>   therefore,
> This liquid abounds in carbonic acid.

In this case a person may not clearly understand what
" acidulous mineral water " means ; and " carbonic acid "
may be a term to him altogether without meaning ; still,
supposing he grants the premises, he cannot resist the con-
clusion.

Take another case, in which the premises are obviously
false :—

> All quadrupeds have wings :
> Man is a quadruped; therefore,
> Man has wings.

Every one perceives at once that each of these propositions
is absurd ; yet still the conclusion is legitimately drawn from
the premises.   The *reasoning* is correct ; the *data* is wrong ;
if the premises were true, the inference would be true like-
wise.

Again, we may substitute letters of the alphabet to repre-
sent whatever we please, and the reasoning, if the process be
correctly conducted, will be perfectly conclusive.   Thus, in
mathematics, we say, A is equal to B : C is equal to A ;
therefore, C is equal to B.   Here we correctly infer the
equality of C to B, because they are each equal to A ; and
this holds good whatever these symbols represent.   So also

when an act of reasoning is stated at full length, and in its proper form. For instance,

> All A is B :
> All C is A ; therefore,
> All C is B.

In this syllogism, "A" may stand for "wicked men;" "B" for "miserable;" and "C" for "tyrants:" and then, ranged in due form, we have the following valid argument :—

> All wicked men are miserable :
> All tyrants are wicked men ; therefore,
> All tyrants are miserable.

You may thus substitute for the letters A, B, C, respectively, whatever terms you please ; and, if you preserve the proper form, the reasoning will always be equally conclusive.

It will, therefore, appear evident that the validity of correct reasoning does not depend on the *sense* of the words used, but on a certain connexion that is seen to subsist between the premises and the conclusion. In the above example, for instance, in the first premise, it is assumed universally that whatever "A" denotes, of the *whole* of it "B" may be affirmed ; thus, "All A is B." Then, in the second premise, whatever "C" represents, it is assumed that it is included in "A," it is a part of it ; "All C is A." Then, as whatever can be said of a whole can be said of any part of that whole, we are warranted to affirm in the conclusion, that "All C is B."

The same process takes place in negative as in affirmative arguments. Thus :—

> No deceitful man is happy :
> This man is deceitful ; therefore,
> He is not happy :—equivalent to this :—

> > No A is B :
> > C is A ; therefore,
> > C is not B.

This is a valid argument with a negative conclusion, and its conclusiveness rests upon the same principle as above. Hence the following maxim has been laid down as universally

applicable,—"*Whatever is affirmed or denied of any class universally, may be affirmed or denied of anything comprehended in that class.*" This is the UNIVERSAL PRINCIPLE OF ALL REASONING, however complex or extended the argumentation may be. When carefully examined, and unfolded, and reduced to its constituent elements, the longest series of the most rapid discursive reasoning will be found to consist in merely a repetition of this simple operation. Whenever we legitimately prove any point, we simply refer something to a class in which it is included, and of the whole of which class the conclusion, whether affirmative or negative, is already predicted.

It must not be thought, however, that reasoning either does or should assume, on all occasions, the extended form of the syllogism. In most cases we are too impatient of delay and chilling formality to tolerate such a practice, even were it necessary or desirable. Happily it is neither. Sometimes what we denominate *one* argument, consists of *many*, compressed together in a single sentence, for the sake of brevity and despatch. As usually stated in its abbreviated form, an act of reasoning consists of two propositions, the connexion of which, as premise and conclusion, is at once perceived and admitted. It may be the logical connexion between a cause and its effect; as when we say, the thermometer is below 32°; therefore it freezes. Here we infer the cause from the effect. Or, when we say, The cold is so intense that it freezes; therefore, the thermometer is below 32°. In this case we infer the effect from its cause.

If, in either case, a doubt were started as to the connexion affirmed, we should then be compelled to fall back upon a general proposition including our particular inference, and state our argument in a full-length syllogism. Thus :—

Whenever the thermometer is below 32° it freezes :
It is below 32° at present; therefore,
It freezes. Again :—

Whenever the cold is so intense that it freezes,
   the thermometer is below 32° :
It freezes just now ; therefore,
The thermometer is below 32°.

It may be the logical connexion between a general and a particular proposition ; as when we say, All ambitious men are miserable ; therefore, Julius Cæsar was miserable : the implied connexion being, " Julius Cæsar was ambitious ; "—or it may be the connexion between a particular and a particular ; as, Julius Cæsar was ambitious ; therefore, He was miserable : the implied connexion being, " All ambitious men are miserable."

. It often happens, however, that there is an apparent connexion between certain premises and a conclusion, while the argument is altogether unsound. When these seeming arguments are adorned with the flowers of Rhetoric, and advanced with all the confidence of an oracle, even the cautious and intelligent are apt to be thrown off their guard ; then bold assertion, and mere declamation, will assume the semblance and prerogatives of conclusive reasoning. Moreover, when a person suspects or believes that there is some fallacy lurking in an argument, whether clearly and briefly stated, or enveloped in oratorical verbiage, he will often be at a loss to detect and expose it, if he be not acquainted with the principles and laws of sound argumentation.

Take, for example, the following fallacious argument :—

> Every virtuous youth is attentive to his studies :
> This young man is attentive to his studies ;
>   therefore,
> He is a virtuous youth.

In the heat of debate, such an argument might be passed off as valid, more especially if the conclusion were such as we believed or wished to be true. And some might not be able to detect and expose the fallacy, even when thus distinctly stated, and their attention particularly directed to it as being unsound. Yet this argument, in so far as the *reasoning* is concerned, exactly corresponds with the following :—

> Every Elephant breathes :
> An Eagle breathes ; therefore,
> An Eagle is an Elephant.

Now, though natural sagacity may enable a person thus to expose a fallacy, by bringing forward another precisely similar,

the conclusion of which is manifestly absurd ; and though, on many accounts, it may often be needful, and proper, and highly useful, to act in this way ; still, it is much more convenient and satisfactory to have a universal test that we can apply to these seeming arguments, by means of which their fallaciousness may be at once rendered evident.   This test Logic provides.   By means of the general Maxim, formerly stated, to which all conclusive reasoning is conformed, we are enabled to discover where a fallacy lurks, and to strip it of its vain pretensions.   Let the argument be expressed in the form of a regular syllogism.   If it be valid, the above Maxim will apply to it ; or, without changing its meaning, it can be, by logical rules, reduced to such a form as that it will apply ; and then the conclusiveness of the reasoning is evident from the mere form of the expression.   To this form, however, a fallacious argument cannot be reduced.   When brought as near to it as possible, and when mere symbols are substituted for terms that are fitted or intended to deceive, the unsoundness of the argument is made evident by its not conforming to the universal law of all conclusive reasoning.

For instance, take the example given above :—

> Every virtuous youth is attentive to his studies :
> This young man is attentive to his studies ;
>   therefore,
> He is a virtuous youth.

The parallel example to this, was—

> Every Elephant breathes :
> An Eagle breathes ; therefore,
> An Eagle is an Elephant.

Each of these, if stated in symbols, will stand thus : " A is B : C is B ; therefore, C is A."   Now, the general Rule, that applies to all correct reasoning, is : " whatever is affirmed or denied of a whole class, may be affirmed or denied of everything comprehended under that class."   In the above example, " B " is affirmed universally of the class " A ;" it may therefore be affirmed of everything included in " A."   But, in the next premise, there is no reference made to " A ;"—" B " is merely affirmed, a second time, of *another* class, " C," that has

no connexion with "A." No inference, therefore, can be drawn. It is evident that whatever is truly affirmed of a *whole* class may be affirmed of everything which *that* class contains; but, it by no means follows, because the same thing may be affirmed of *another* class, totally different and distinct, that therefore these two classes must be one in every respect. We have here merely two propositions, no way connected together, but repeating the same affirmation respecting two different subjects. From this, evidently, nothing can be inferred.

Take, as another example of sophistical reasoning, the following :—

> Every proud man is unhappy:
> This person is not a proud man; therefore,
> He is not unhappy.

This argument is precisely similar to the following :—

> Every dog is an animal:
> A fox is not a dog; therefore,
> A fox is not an animal.

Or thus : " Every A is B : C is not A ; therefore, C is not B." Here, "B" is affirmed of the *whole* of "A ;" it might therefore, according to the above rule, be affirmed of everything included in "A ;" but in the second proposition, nothing is said to be *included* in "A," but "C" is merely *excluded* from the class which "A" represents. There is, therefore, no argument here; since what is truly affirmed of a *whole* class may be true not only of all included in *that* class, but also of many *other* classes beside. Whether, in such apparent arguments, the conclusion be a truth or a falsehood, it is not *warranted by the premises,* and therefore such arguments are denominated Fallacies.

From these various examples it will be seen what Logic professes to accomplish. Its object is to aid us in constructing and testing valid arguments, and in detecting and exposing such as are fallacious. For this purpose, its chief business is to explain, illustrate, and apply the above-mentioned Universal Principle of all correct Reasoning, as evolving the logical connexion between premises and the conclusions legitimately drawn from them. In order to do this, clearly and accurately, various

logical instruments are necessary; technical language must be employed; divisions and distinctions must be made; and general rules must be laid down; that thus our progress may become more speedy and safe. These will be developed as we proceed. Be it remembered, however, for our encouragement, that these necessary aids in the study of Reasoning are not more numerous or perplexing than are found needful and useful in other branches of study. The technical terms and rules of Grammar, or Arithmetic, or Chemistry, are not at all shorter, or more easily understood, remembered, and applied, than those which the Logician finds it necessary to employ. Let but these be distinctly understood at the outset; let them be firmly fixed in the memory; let skill and readiness be obtained, in their exact application, by practice and perseverance, and they cannot fail of being extensively useful, both in guiding us aright, and guarding us from imposition, in argumentation.

It has been disputed, both in ancient and modern times, whether Logic is an Art or a Science. Some have maintained that it is a Science; others that it is merely an Art;—some, that it is properly speaking neither; others, that it is both. With this last opinion we coincide. While investigating the theory of reasoning, and instituting an analysis of the principles on which it is conducted, Logic is strictly a *Science* :— while furnishing practical rules to guard the mind from error in its deductions, it is properly an *Art*. To understand Logic in so far as it is a Science, and in so far as it is an Art, is to comprehend at once its nature, province, and use.

Logic, as a Science, ascertains and exhibits the connexion that must subsist between the propositions of a legitimate argument. It points out the principle on which one proposition is inferred from other propositions, and why, with the given premises, the conclusion drawn is irresistible. Logic, as a Science, has to do with the law that obtains in every act of reasoning, whatever the subject-matter may be, and which law, we have seen, is universally the same. As a Science, it deals with Reasoning itself; as an Art, it lays down rules to enable us to detect the various errors that vitiate the legitimacy of our conclusions. As a Science, it arises out of principles that are self-evident; as an Art, it determines the characteristics of terms and propositions, and thus regulates

the vehicle of reasoning—language—in the various logical forms which it assumes in argumentation. As a Science, it could not practically benefit us in reasoning without these rules; as an Art, it could not satisfy our demands for a theoretical explanation, without its clear dependence on fundamental and self-evident principles. As a Science and an Art, —a practical Science—a scientific Art,—it meets both. It communicates knowledge not only that we may *know*, but that we may reduce it to practice. It thus commends itself to our intelligence as an instrument of great power for aiding us in conducting the reasoning process ourselves, and for testing it when employed by others—whether for the satisfaction of our own minds, or for the accurate and effective application of our reasoning to the minds of others.

Having thus endeavoured to ascertain the nature and object of Logic, and to define and fix its appropriate limits, we shall now take a rapid sketch of its history, and attempt to remove the prejudices and errors that abound respecting it.

The earliest writer on Logic was Zeno the Eleatic. His work on this subject was divided into three parts. The first treated of consequences; the second, of colloquial argumentation; and the third contained a method of wrangling whereby the disputant might entangle his opponent by sophistical reasoning. Hence arose the Sophists, who were plentifully furnished with the weapons which this art of wrangling supplied, and who discussed with the greatest eagerness the most abstruse or the most trifling topics. It is probable the Greeks considered this an ingenious recreation, and had recourse to it merely for amusement, or for the cultivation of their intellectual powers;—though it might be indulged in too much, and was sometimes prostituted to unworthy purposes. With this art, however, Logic has no concern— but to detect and expose its intricate absurdities. Yet the Sophists retained possession of the philosophic schools from the 35th to the 90th Olympiad.

It is only the second part of Zeno's work that properly belongs to Logic. The interrogatory method of disputation, which he introduced, is founded on strictly logical principles. It was this mode of reasoning that Socrates adopted, wh

flourished about B.C. 400, and who is justly esteemed one of the most celebrated philosophers of antiquity. Both the manner and the matter of his argumentations did equal honour to his virtues and talent. He frequented the public places of resort, and mingled familiarly with those whom he wished to benefit. He entered into general conversation with them; proposed simple questions; and gradually drew from themselves such concessions as effectually condemned their vices, or exposed their errors. It is from him that the *Socratic Dialogue* derives its name—many valuable specimens of which are preserved in the writings of Xenophon and Plato.

This mode of reasoning, however, was soon perverted. Euclid of Megara, and other disciples of Socrates, devoting themselves to the intricate fallacies of the schools, banished that philosophy to its native skies, which Socrates had brought down to the earth.

This was not the case, however, with all his pupils. Among them Plato stands conspicuous; who, to all the other branches of knowledge which he studied and adorned, added an intimate acquaintance with the reasoning art. He has indeed left nothing that expressly treats of Logic; yet he speaks of it in the highest terms of approbation, and by his happy method of philosophical research, did much to prepare the way for its clearer development. About this time rules were invented for defining, and dividing, and classifying our ideas. Yet with regard to reasoning itself, little or nothing was accomplished till the renowned discoverer of the Syllogism appeared.

Aristotle was born at Stagira about B.C. 385. He was brought up at the court of Macedon; was for twenty years the favourite pupil of Plato; and being the tutor of Alexander the Great, he was furnished by him with everything necessary to the successful prosecution of his philosophical inquiries. His masterly genius, and the favourable opportunities he had for improvement, made him the first spirit of his age. He was a man of indefatigable industry, and immense reading; and for nearly two thousand years he exercised as sovereign a dominion over the opinions of mankind, as did his royal pupil, for a time, over their liberties and fortunes.

The writings of this philosopher embrace almost every department of knowledge. It was his Dialectics, however, that gained him his greatest renown. We are indebted to the Stagirite for all the chief principles of the Science of reasoning. Some of the materials of the system were indeed prepared before his time; but he laid the foundation; and to this day it remains substantially the same as when he bequeathed it to posterity.

It does not appear that the Logic of Aristotle drew much attention from his contemporaries. At his decease he bequeathed his writings to Theophrastus, his pupil and successor. Theophrastus left them to Nileus of Scepsis; who, though not a philosopher himself, was nevertheless highly delighted at possessing so valuable a treasure. At this time the King of Pergamos was collecting Manuscripts for the Alexandrian Library; and Nileus, fearing lest he should be deprived of the writings of the philosopher, concealed them in a cellar, where they remained for upwards of a hundred and thirty years. It is uncertain by whom, or in what way, they were rescued from their confinement; but it is certain they were in no small degree injured by the damps and the vermin of their dreary habitation. They were afterwards purchased by Apellicon, whose passion for books was insatiable. By him, it is supposed, they were subjected to many corrections and interpolations, which injured them more than their confinement at Scepsis. After this they were carried to Rome by the Dictator Sylla. But the reputation of Aristotle was never great among the Romans. Cicero mentions his writings, and says that they deserve to be better known. But the science seems not to have been at all cultivated. In the fifth century of the Christian era Aristotle's Logic was translated into the Latin language by Boethius, " the last sage of the ancient world." But the fall of the Roman Empire introduced the dark ages, when ignorance universally reigned : and we lose all traces of the science till at length light began to dawn in the Eastern world among the Saracens and Arabians.

In the East, literature flourished from the beginning of the ninth to the close of the thirteenth century. Al Mamoon, a Saracen prince, had the works of the Grecian philosophers translated into Syriac and Arabic, and they were diligently

studied in the colleges at Bagdad and Grand Cairo. Amongst them, Aristotle soon became a favourite author. His Logic especially was much admired. The syllogism became a noble instrument for explaining and establishing the doctrines of the Koran. This, in no small degree, contributed to the injury of the science. And when we add that the above-mentioned prince caused the original manuscripts to be destroyed; and that, when the Saracens conquered the West, corrupt translations were introduced and diligently studied, it will not appear wonderful that Logic should have been so perverted, as it afterwards was, in the idle and violent disputations of the schools.

In the Middle Ages, numerous controversies exercised the ingenuity of the learned. To attain skill in the management of these disputes was the chief object aimed at in a liberal education. That the Syllogism might be perverted to aid this species of wrangling was soon perceived. Hence, to be able to wield this instrument to advantage became the chief object of ambition. The disputations were not confined within the walls of colleges. Large public assemblies, consisting of the first beauty, rank, and fashion, met together to witness the contest and applaud the victor. Frequently the conqueror, like a knight-errant of chivalry, wandered about in search of Quixotic adventures, challenging everywhere those who were renowned for syllogistic superiority.

The topics selected for these discussions were worthy of the occasion. We may subjoin a specimen from that department of Natural Theology, which they dignified with the name of Angelography. They gravely discussed, " Whether more than one angel could exist at the same moment of time in the same physical point ?" " Whether angels can visibly discern objects in the dark ?" or, " Whether they can pass from one point of space to another without passing through the intermediate points ?" These and similar all-important questions were nobly supported or controverted. The combatants were ranged in opposite parties; and sometimes the violence and acrimony of their disputes rose so high as to endanger the public peace, and call for the interference of the public authorities.

The syllogism being the grand instrument by which these

disputes were carried on, and by the skilful management of which victory could only be obtained, was looked upon as the noblest achievement of the human intellect. It was styled the universal organ of science ; the eye of intellect; and, like the sun, the light of the world. It was said to be, " *ars artium, scientia scientiarum, organum organorum, instrumentum instrumentorum, ancilla, clavis, testa, murus philosophiæ, docendi dicendique magistra, veri falsique disceptatrix et judex.*" Nor were the praises heaped on the philosopher himself less absurd or extravagant. It was gravely asserted " that nature was not altogether complete till Aristotle was born, and that in him she received the finishing stroke, and could not advance farther."

The dominion which Aristotle thus gained in literature, and science, and religion too, was most pernicious. What wonder is it, then, if men of common sense became impatient of the yoke ? Was it not to be expected that they would rise, and, with one sweeping stroke, rid themselves of a system that had been so grossly perverted and abused ? This we find actually took place.

In the fifteenth century a variety of favourable events ushered in the revival of letters—a circumstance of the greatest importance in the history of Logic. When Constantinople was taken in A.D. 1453, many distinguished Greeks took refuge in Italy, and in other parts of Western Europe. By them the writings of the Greek philosophers were again brought into notice, and the most happy results attended the study of these inimitable productions. The reformation of religion ; the discovery of America ; the invention of the art of printing ; all exerted a favourable influence on the Arts and Sciences. And many persons in the learned world arose, who, by wit, and argument, and irresistible eloquence, boldly attacked the author of the syllogism. Erasmus and Luther deserve to be honourably mentioned. The latter renounced the Pope both in religion and philosophy. He thundered against the syllogism with all the vigour of his masculine and intrepid mind ; and, had it not been for Melancthon, he would in all probability have accomplished a complete reformation in the schools. Ramus and Des Cartes in France, and Leibnitz in Germany, followed in the same train ; and in England the immortal

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Lord Bacon did much to emancipate the world from the absurdities of the scholastic philosophy.

The errors into which the schoolmen had fallen, justify the severity with which their system was assailed. But their error lay not in their studying and prizing Logic, but in their utterly mistaking both its nature and object. They either degraded it to a mere instrumental art, fitted only for ingenious subtile trifling; or they elevated it to the dignity of being the only instrument necessary for physical investigation, and the discovery of truth. It was against these glaring mistakes, this sad perversion of the system, that the censures of Lord Bacon were principally directed;—although the weight of his name is often brought forward to discountenance all Logical pursuits whatever. He had too much wisdom, however, to condemn the legitimate cultivation of any science, because it had been abused. It was the reformation, not the destruction, of the sciences that he laboured to promote; and many passages might be quoted from his treatise *De Augmentis Scientiarum*, in which he commends both Logical studies, and their illustrious author.

After the days of Lord Bacon, one of the most determined opponents of the Aristotelian Logic was Locke, the author of the justly-celebrated Essay on the Human Understanding. Whoever has studied Logic, and reads his remarks, will perceive that they are founded on mistake,—a circumstance pardonable, perhaps, even in so great a mind, when we consider how much logicians themselves have been chargeable with the same error. His objections to the science, having often been repeated from his time to the present day, merit our attention.

He condemns the syllogism as not being "the only proper instrument of reason in the discovery of truth." We grant it; but what then? Must chemistry be condemned because it does not impart skill in the Mathematics? Is the science of Optics destitute of utility because it leaves us in ignorance respecting the formation of the earth? The proper instruments for the discovery of truth, and the enlargement of our knowledge, are undoubtedly observation and experiment, so admirably brought to bear on the study of nature in the Inductive Philosophy. But the province of Logic is quite distinct from

this. It is occupied exclusively with Reasoning. And surely it is no valid objection to one science that it does not accomplish that which is the object of another.

Locke objects to this science too as being a peculiar "way of reasoning," intended to be substituted for the common ordinary method of argumentation. But it is not a peculiar method of reasoning, which may, or may not, be adopted at pleasure. All correct reasoning is logical. It never was the intention of Logic to introduce the syllogism, expressed at full length, into our ordinary discussions ; this would be equally as absurd as to encumber every step of a mathematical process by writing, at full length, the axiom or proposition on which the proof depends ; or to say, " that to speak grammatically, means to parse every sentence we utter." Hence all that Locke says respecting the "simple and natural disposition" of ordinary reasoning, and the "perplexed repetitions and jumble" of syllogistic reasoning, is irrelevant. All reasoning must be syllogistic, if it is reasoning at all—though not necessarily expressed in the form of a regular syllogism. Even the Socratic Dialogue, than which reasoning cannot adopt a more simple, flowing, or popular form, is strictly syllogistical, being a hypothetical *Sorites*, which can easily be reduced to a series of regular syllogisms. In short, Logic does not introduce the syllogism as a mode of reasoning distinct from, and intended to supersede, any other mode : but as *the* form to which all correct reasoning may be reduced, and by which its validity may be ascertained.

Another argument which Locke brings against this science is, "that there are many men who reason exceedingly clear and rightly, who know not how to make a syllogism." This statement is frequently brought forward at the present day as justifying the neglect of logical studies. But is scientific knowledge of no use to the practical mechanic, though without it he may perform his work with considerable dexterity ? Does the musician act wisely who neglects the rules of his art, and trusts merely to his taste, and natural abilities, and acquired habits, for reaching eminence in his profession ? Assuredly not. A system of rules, drawn from a scientific acquaintance with his profession, is considered necessary by every one. And he that would trust, in this respect, to prac-

tical wisdom, or common sense, or mere unaided experience, to the exclusion of systematic knowledge, would be a fit object for ridicule or pity. Why, then, should scientific knowledge be considered unnecessary respecting Reasoning, which has been justly styled the appropriate intellectual occupation of Man? Is it of no use to be able to resolve an argument into its constituent elements; to understand the theory on which it rests; to be acquainted with the rules by which it is constructed; and to learn to do that *well* which must be done constantly every day of our lives? In the application of these principles, there will still be enough left for good sense and natural talent to accomplish. But an acquaintance with these principles must materially aid both our skill and confidence when engaged in argumentation.

Even admitting that little practical benefit resulted from this study, it would not follow that it should be consigned to neglect and oblivion. Knowledge is valuable for its own sake. The exercise of the mental powers on any subject contributes to their improvement. If we venerate the relics of antiquity; if the achievements of genius demand our admiration and regard; surely that which swayed the learned world for ages deserves to be studied, were it nothing but a literary curiosity.

The next writer on this subject who claims our notice is Watts. But Logic has not been more unfortunate in its avowed enemies, than it has been in its professed friends. Hence even the treatise of Watts, which has attained so great celebrity, has done much to injure this study. He appears to have been misled by the specious arguments of Locke against the syllogism. Locke ridicules the idea—as well he might—that God had merely made men "two-legged creatures, and left it to Aristotle to make them rational." Dr Watts easily perceived that the Aristotelian Logic was insufficient for this vast achievement. But he seems not to have detected the fallacy that lurks in this philosopher's reasoning. Hence, instead of shewing that it was neither the province nor object of Logic to make men reasonable, he has endeavoured to raise it to this dignity by constructing a system denominated *The Right Use of Reason*, which is to improve all the intellectual powers of man, and assist us both in searching after

truth, and communicating it to others. "The design of Logic," he says, "is to teach us the right use of our reason, or intellectual powers, and the improvement of them in ourselves and others." Surely this is an object too vast to be accomplished by any *one* science. It is the end which the whole circle of the sciences aims to effect by their united agency. To claim it, then, as the peculiar province of Logic, is to raise expectations which can never be realised, and to bring the study into unmerited obloquy. The rules which Watts has laid down respecting ideas, and prejudices, and rules of judgment, may all be very important and useful; and in some respects they may be connected with our science. But it is not the object of Logic to teach us to acquire a treasure of ideas; to remove all sources of prejudices and error; and to give us complete certainty respecting the truth or falsity of every proposition. No system of rules can effect this. While the human mind remains as it is, and the sources of error are so multiplied around us, no combination of scientific principles can enable us to judge with absolute certainty on every subject. To represent Logic as being a system of universal knowledge fitted to accomplish this end—as being a *panacea* for all the defects and errors of the mind—is certainly giving an erroneous view of the subject. Yet this idea pervades the whole of Dr Watts' treatise.

Errors in reasoning may spring from two distinct sources—either from the *subject* about which we are reasoning, or from the *manner* in which the process is conducted. Now, it ought to be particularly remembered that it is only the *latter* with which Logic is properly concerned. It may be applied to all branches of human knowledge; but its object is not to decide on the truth or falsity, the correctness or incorrectness, of the statements made, but to see that the inferences drawn from them be strictly correct. If the premises be true, the conclusion, if logically deduced, will be true likewise. If the premises are false, the conclusion may be logically correct, although in reality it may be an erroneous statement. If no error is suffered to take place between the statements made and the inferences drawn from them, Logic has accomplished its work, whether these statements be true, or whether they be false.

That the chief sources of error spring from the subject-mat-

ter, not from the process of reasoning, is abundantly evident. Hence many ingenious writers, since the days of Watts, have treated Logic with contempt, because it removes not the greatest hindrance to our attaining truth and certainty in our argumentations. But is it fair to condemn a science because it does not accomplish impossibilities? All that comes within its own province it is able to do well. No more is expected from any other science. Why should this be insufficient in respect to Logic? Chemistry is not censured because it does not *provide* the substances which it analyses and combines; or because these substances are not all simple and unadulterated. When they are presented to the Chemist, his work begins; and his object is accomplished, when, by analysis or synthesis, he produces the simple or compound substance, into which they may be resolved or combined. All reasoning must be founded on knowledge—on facts either true or false. With the acquisition of this knowledge, or with the truth or falsity of these facts, considered as such, Logic has nothing to do. All these must be provided for in the various ways by which man gains knowledge and understanding. This knowledge, when acquired, the Logician operates upon. When it is presented to him, he combines and analyses it, according to the rules of his art, or the principles of his science, and draws such inferences from it as it really and properly warrants. If any *unsound mode of arguing* creeps into the reasoning process, any " ingenious mixture of truth and falsehood, so entangled— so intimately blended—that the falsehood is (in the chemical phrase) *held in solution :* one drop of sound Logic is that test which immediately disunites them, makes the foreign substance visible, and precipitates it to the bottom." This is the proper province of Logic. If it is fitted to gain this end, surely this is of sufficient importance to preserve it from neglect, though it may not be able to put us in possession of universal truth— with less than which, however, its opponents seem unwilling to be satisfied.

Another writer who must also be mentioned in this brief sketch is Mill, whose " System of Logic, Ratiocinative and Inductive," has recently appeared. This work has obtained just celebrity for the patient, penetrating thought which its

author displays; and for the apt, lucid, and interesting expo-
sition therein given of various abstract and difficult questions
connected with mental, physical, and moral science. It em-
braces a very wide field; and no intelligent reader can follow
the author through his able disquisitions, without deriving
from them both pleasure and profit. We cannot agree with
this writer in the views he has propounded respecting the
Syllogism—for reasons that will be given in another part of
this brief treatise. Still we hail the appearance of Mr Mill's
masterly work as likely to have a very beneficial influence on
the study of Logic. There is evidently a growing interest
awakened on the subject; and we trust that Logic, after
having been vastly overrated by some, and unjustly under-
valued by others, is now beginning to be appreciated accord-
ing to its real merits and importance. The strictly scientific
character of the system has been demonstrated, by shewing
that the process can be carried on by arbitrary symbols, with-
out any regard whatever to the signification of the terms;—
the peculiar province of the science has been recognised and
fixed, so that writers on this subject, instead of wandering
through every field of science, may now confine themselves to
their proper home;—the extravagant expectations raised by
the unwise exaggerations of its friends, have sunk down
within something like reasonable limits;—and even the deep-
rooted prejudices of its enemies are beginning to disappear.
One of the principal writers at the present day, to whom
these happy results are to be attributed, is . Dr Whately,
Archbishop of Dublin. His admirable work on this subject
has done much to rescue the science from neglect and misre-
presentation; and has given a new life and direction to the
study that must be beneficial.

It is not to be expected, indeed, that this study will soon
become popular. Here there is little to please the taste, fill
the imagination, or strike the senses. The beauties of Poetry,
the sublime wonders of Astronomy, and the striking experi-
ments of Chemistry, invest these studies with a fascination
which few can resist. But Logic treats of what is common
and familiar to all. Few have any curiosity to know what it
is, or what it proposes to accomplish;—while many suppose
they are in the possession of all its advantages already, with-

out being indebted to its aid. We doubt not, however, but
that this study, when better known, and cultivated on right
principles, will gradually rise in reputation. To understand
the theory of Reasoning, the principles on which it is founded,
and the rules to which it has been reduced, is an object
worthy the attention of every human being. The advantages
to be derived from a study embracing these particulars, ought
to recommend it as an essential part of a liberal education.

OF THE OPERATIONS OF THE MIND.

IN every process of argumentation there are three opera-
tions of the mind called into exercise,—Simple Apprehension,
Judgment, and Reasoning. By *Simple Apprehension* we gain
our notions or ideas ; by *Judgment* we compare our ideas
together, and pronounce on their agreement or disagreement ;
by *Reasoning* we proceed from certain judgments to another
judgment founded upon them, or from which it necessarily
follows.

To analyse these processes, and investigate their phenomena,
in so far as they are purely *mental* exercises, belongs to another
department of science. It is only as they are employed in
Reasoning that they come within the province of Logic. An
act of simple apprehension embodied in language, is called a
term ; an act of judgment, when expressed, is called a *proposi-
tion ;* and an act of reasoning, an *argument.*

These, however, are all liable to serious defects. Terms
may be *indistinct ;* propositions may be *false ;* and argu-
ments may be *fallacious.* It is proper, therefore, to guard
against these defects, as much as possible, by the best means
we can devise. This Logic endeavours to do, by a system of
rules based on scientific principles.

Logic is, therefore, divided into three parts, sometimes
denominated after the three operations of the intellect referred
to above. The first treats of Terms ; the second of Proposi-
tions ; the third of Arguments.

PART I.

OF TERMS.

In order to conduct the process of Reasoning properly, it is of importance that we be able clearly to express our own meaning, and fully to understand the statements of others. For this purpose it has been found necessary, in giving accurate explanations of the *principles* on which Reasoning proceeds, and in laying down *rules* for our guidance, to employ a *technical language*—" a regularly-formed set of expressions, distinctly defined and agreed on." This is found to be indispensable even in mechanical operations. If a workman had not well-defined names for the several *operations* he performs, and for the several *instruments* he employs, he would be involved in endless difficulties and perplexities, both in teaching and exercising his handicraft. So also in various branches of study. If we had not such words as Noun, Adjective, Verb, and other Parts of Speech, clearly defined, and the various rules of Grammar fixed and well understood, how could we, without great inconvenience, acquire or communicate a knowledge of Grammar? And if Addition, Subtraction, and other arithmetical processes were not exactly defined, and fixed rules laid down for conducting these operations, we should find it a tedious and toilsome work to perform even those simple calculations which we now learn to do with certainty and perfect ease. And how could we, without such terms, make others see that our calculations were correctly made? It has, therefore, been found necessary, in what relates to the Reasoning process, to employ technical terms, in explaining principles, and laying down rules. And these terms, and

explanations, and rules, will not be found more difficult to be understood, or remembered, or applied to practice, than those in any other branch of study. "You are to observe, however, that technical language and rules, if you would make them really useful, must be not only *distinctly understood*, but also learnt and *remembered* as familiarly as the alphabet, and employed *constantly* and with scrupulous *exactness;* otherwise technical language will prove an encumbrance instead of an advantage ; just as a suit of clothes would be, if, instead of putting them on and *wearing* them, you were to carry them about in your hand." *

The first part of Logic treats of *terms.* Terms may be confused, indistinct, and inadequate. Logic endeavours, as far as possible, to remove this obscurity, and to give them a clear and determinate meaning, by rules of *Distinction, Classification, Division,* and *Definition.* These have been called *Logical Instruments ;* it is only to the last two, however, that this title peculiarly belongs.

A knowledge of the instruments we employ in Reasoning is indispensable to our progress. No art can be of much practical utility unless we know how to construct, and use, and designate the tools which that art renders necessary. Thus only can we perform our work correctly, neatly, with expedition and ease.

CHAPTER I.

OF DISTINCTION.

ERRORS in Reasoning frequently spring from our not properly distinguishing things that are different. Distinctions, then, if founded in truth, may be of great use in keeping us from mistake, and in assisting us to detect error. Some distinctions are *verbal,* others are *real.* As an example of the former, the word "cause" may be selected. Properly speak-

* "Easy Lessons on Reasoning," p. 12.—An admirable work, by one of the first Logicians of the day.

ing, there is but *one* cause—the self-originated fountain of all being. The term, however, is frequently applied to animate and inanimate objects, only adding the word "secondary" to qualify the expression. There are also other distinctions in reference to causes. Among these the most important are, the efficient cause, the material cause, the formal cause, and the final cause. The "efficient cause" is that from which the effect proceeds. The "material cause" is that of which it is produced. The "formal cause" is the manner in which it is accomplished. And the "final cause" is the object intended to be achieved. Verbal distinctions, however, more properly belong to Grammar than to Logic.

Distinctions that are *real* are those that retain their signification into whatever language they may be translated. Of these there are many in common use, which, though not exclusively belonging to the science of Reasoning, may here be mentioned. A number of the usual divisions of words given in works on Logic are not so much divisions of the words themselves as of the manner in which they are employed. This is the case with *univocal, equivocal,* and *analogous* terms. They are not distinct classes of nouns, but the same term used in either signification, according to the pleasure of the writer. Thus the term "house" may be considered *univocal,* because it is only applicable, in the same sense, to one kind of object. But it may be used also so as to give it a different meaning every time it is employed, and then it would properly be called *equivocal.* When two objects have a certain resemblance or analogy to each other, they are often called by the same name. Thus, a "blade of grass," and a "blade of a sword," resemble each other. In this case, then, the term is called *analogous.* But all these are not distinctions in the terms themselves, but only in the manner of using them.

Terms in which a real distinction obtains have been arranged into the following classes:—

1. *Singular and Common Terms.*—A *singular* term denotes one object considered as an individual existence ; as, "Alexander the Great," the "city of Paris," "this tree," "that river." These terms cannot be said *affirmatively* of anything but themselves.—A *common* term stands for several individuals called its *significates,* and may be affirmed of all comprehended

in the class to which it belongs. Thus, "man," "city," "tree," "river," may be affirmed of any object included in these classes. As, "Pompey and Cæsar were men." "Paris, London, and Calcutta are cities." "The Euphrates, the Tigris, the Indus, and the Ganges are rivers."

2. *Absolute, Relative, and Correlative Terms.*—An object viewed as a whole without any reference to another with which it may be connected, is denoted by an *absolute* term ; as, "a man," "a living creature," "a human being."—A *relative* term expresses an object considered as a part of a whole, viewed in reference to that complex object. Thus, "Teacher," "Scholar," "Master," "Servant," are relative terms, because they are each a part of the complex objects, "Teacher-and-scholar," "Master-and-servant."—When objects are related to each other, and viewed in reference to that relation, they are expressed by *correlative terms.* Thus, "Father and Son," "King and Subject," "Master and Servant," are correlative. But, "King and Servant," "Father and Subject," are not correlative terms, although the *servant* may be the *subject* of the king, and the *subject* may be the *son* of the father.

3. *Opposite and Compatible Terms.*—When there are two views of a single object which cannot be taken at the same time, this is expressed by *opposite* terms.—When both views may be taken of the same object at the same time, this is denoted by *compatible* or consistent terms. Thus, "hard and soft," "cold and hot," "black and white," are *opposite* terms. But, "hard and cold," "white and soft," are *compatible* terms.

4. *Abstract and Concrete Terms.*—An *abstract* term expresses an object without any reference to the subject in which it exists. As, "wisdom," "folly," "poverty," "riches."—When an idea is expressed in conjunction with the object to which it refers, it is expressed by a *concrete* term. As, "wise," "foolish," "poor," "rich."

5. *Connotative and Non-connotative Terms.*—When a term applied to any object implies in its signification some attribute belonging to that object, it is called *connotative;* it "connotes," or *notes together with* the object something considered as inherent in that object. Thus, "the King of the French," "the First Lord of the Treasury," are *connotative* terms, because

these appellations not only point out the individuals to whom they are applied, but also respectively the office or dignity with which these persons are invested.—But when a term merely *denotes* an object without implying any attribute of that object, it is called *non-connotative.* Thus, "Louis Philippe," "Sir Robert Peel," *denote* respectively the same objects as the two former, but they do not *connote* any attribute of these individuals. A non-connotative term denotes a subject only, or an attribute only. A connotative term denotes a subject, and connotes an attribute. "Cæsar," "Paris," "Russia," denote a subject only; "whiteness," "shortness," "happiness," signify an attribute only; none of these, therefore, are connotative. But "white," "short," "happy," are connotative terms. The term "white" denotes all white objects, as snow, a lily, the foam of the sea, and implies, or connotes the attribute "whiteness." The information which a term conveys is found, not in what it *denotes,* but in what it *connotes.*

6. *Positive, Negative, and Privative Terms.*—A *positive* term expresses a certain view of a subject actually taken of it; as, "a man *speaking,*" "a bird *flying.*"—When this view *cannot* be taken of the object, it is denoted by a *negative* term; as, "dumb," "motionless."—When a certain view of a subject *might* be taken of it, but *is* not, this is expressed by a *privative* term; as, "a man silent," "a person not walking."

7. *Definite and Indefinite Terms.*—A privative or negative term, since it does not define and mark out an object, is called an *indefinite* term.—But the positive, because it does define and limit our view of an object, is called *definite.* Thus, "a living creature," "a lion," "a lion roaring," are *definite* terms, because they mark out a particular class of beings, or a particular individual, or a single individual in a particular mode. —But, "not a living creature," "not a lion," are *indefinite,* because they do not restrict our view to any class or individual. They merely exclude *one,* and leave all the rest undetermined.

8. *Contradictory and Contrary Terms.*—When two terms are opposed to each other, the one having, and the other wanting, the negative particle *not,* either expressed or understood, these are called *contradictory* terms. Thus, "a living

creature," and "not a living creature," "a lion," and "not a lion." It is impossible that anything can be *both* these at the same time, and it is impossible also but that everything must either be one of them or the other. Nothing can, at the same time, be both "a living creature," and "not a living creature;" but everything that is conceivable must be one of them. In this way a perfect division of any subject may be made.—But *contrary* terms are merely those that are the most opposite of that class to which they belong. Thus, "rich" and "poor" are *contrary* terms. They cannot be applied to the same object at the same time; but there are many persons to whom *neither* is applicable.

CHAPTER II.

OF CLASSIFICATION.

UNDER this head the ancient Logic treated of the ten *Categories* and the five *Predicables*. The categories were given as a complete enumeration of everything that can be expressed without composition and structure. They were intended to include all the possible objects of thought, knowledge, or discourse, and were supposed to be of special use in assisting the disputant to find *middle terms.* A regular distribution of things under proper heads, is a great help both to the memory and the judgment; and the invention of a classification of this kind, which the speculative part of mankind acquiesced in for two thousand years, is a proof, no doubt, of superiority of genius which is seldom to be found. But that which was here attempted exceeded the reach of human power. The ten categories have, therefore, long been abandoned as of no practical utility. It will be sufficient, then, merely to mention them. They were: *Substantia, Quantitas, Qualitas, Relatio, Actio,* and *Passio ;*—these were considered of special use : the other four, *Ubi, Quando, Situs,* and *Habitus,* were reckoned of less importance. We may remark,

however, that no general classification of the objects of thought, that has been substituted in the place of the ten categories, has, to the present day, been found perfect.

The *Predicables*, however, have maintained their authority to the present time. Of these, therefore, a more extended account is necessary.

A term which can be affirmed of several others has been called a *Predicable*. It must be evident that whatever is affirmatively predicted of another must express some relation that it bears to that object. It must point out either its whole essence, which is called its *species;* or the material part of it, which is called its *genus;* or its distinguishing characteristic, which is called its *differentia;* or something joined to its essence, either separable or inseparable, which is called its *property* or *accident*. This has given rise to the doctrine of the five *Universals*, or *Predicables:* to wit, *Genus, Species, Differentia, Proprium,* and *Accidens*.

The *Genus* is the highest or most universal class, which includes two or more species. Thus, "animal" is a genus including "man," "beast," and all classes of living creatures.

The *Species* is a class comprehended under a higher class, and is composed of individuals. Thus, "Peter," "John," "Thomas," and all the individuals of the human race, are included in the species "man."

The *Differentia* is that which distinguishes one species from another; or it is an essential attribute which belongs to the species, but not to the genus. Thus, "reason" is the differentia of man, because it distinguishes the species "man" from the species "brute;" or because it is a characteristic that belongs to the species "man," but not to the genus "animal."

The *Proprium* is some property peculiar to a species, belonging to the whole of it, to it alone, and to it always, yet not constituting its distinguishing property. Thus "risibility" is the proprium of man; it belongs to the whole species, to this species only, and to it at all times; yet it does not constitute its distinguishing property, for it is less essential to man than rationality. Some of these properties belong to the *whole* of a species, but are not *peculiar* to it; as, "to breathe air," belongs to *every* man, but not to man

only : other properties are *peculiar* to a species, but do not belong to the *whole* of it ; thus, man *only* can be a poet, but it is not *every* man that is so.   These properties, however, are more properly reckoned *accidents*.

The *Accidens* is an attribute not essential to the species, which may or may not be absent without destroying its nature.   Thus, "hot" or "cold," "rich" or "poor," "a native of India," "a native of London," are all accidents ; because, whether absent or present, the essence of the species remains the same.   Those accidents that can be separated from the individual are called *separable* accidents ; those which cannot be separated are called *inseparable*.   A man that is poor may become rich ; "poverty," therefore, is a *separable* accident. He that is a native of England can never be otherwise in that respect ; "a native of England," then, is an *inseparable* accident.

The above may be illustrated by the following Table :—

Every predicable expresses either

The *whole* essence of its subject : viz. Species	or part of its essence	or something *joined* to its essence
	Genus-Difference	
	Property	Accident.

universal and peculiar	universal but not peculiar	peculiar but not universal

inseparable-separable.

The genus and difference make up the Species ; thus, "rational" and "animal" constitute "man."   When, therefore, the genus is spoken of as a *whole*, and said to *contain* the species, this is only a metaphorical expression, signifying that it has a more extensive signification ; thus, "man" is a more

full expression than animal : but " animal" is more *extensive* than man, because it can be predicated of several other species. In the same way the name of a *species* is more *extensive*, but less *full*, than that of an *individual*.

A genus may be either a *summum* or a *subaltern* genus. It is the former when it has no genus above it, or when it cannot be considered a species of any higher class. Thus, "substance" is a *summum genus*, because it is not a species of any higher genus. A *subaltern* genus is both a species of a higher genus, and a genus in reference to the species into which it may be divided. Thus, "animal" is a subaltern genus, because it is included under the higher genus "substance ;" and at the same time it is the genus of "man," "bird," and every species of living creatures. That genus which is the *nearest* that can be predicated of a species is called its *proximum genus ;* thus, "juice" is the proximum genus of wine ; "liquid" is its more remote genus. A species which has under it only *individuals*, and which cannot be considered a genus, because including no species, is called an *infima species.*

Of these predicables some are more universal than others ; and this gave rise to what is taught in Logic respecting the *extension* and the *comprehension* of a term. By the former is meant the number of individuals of which the term may be predicated. The latter signifies all the simple ideas which united constitute what the term denotes. Thus, the term "bird" is applicable to every individual of all the various species of the feathered tribe. This, then, is the *extension* of the term. On the other hand, the same term "bird" may be considered as including the idea of life, sensation, spontaneous motion, the possession of wings, a covering of feathers, and all the properties belonging to this class of living creatures. These ideas united give us the *comprehension* of the term. By attending to this distinction the logical rule will appear evident, that *the greater the extension, the less the comprehension of a term ; and the greater the comprehension, the less the extension.* The term "animal" has a greater extension than "man," because it can be predicated of "man," "beast," "bird," and all living creatures. But "man" is more comprehensive than "animal," because it includes not only all

that the term *animal* does, but all that peculiarly belongs to
the rational animal *man*. In the same way the name of an
individual is more comprehensive than the name of a species,
but its extension is evidently less. "Pompey" can be pre-
dicated only of an individual, but it includes, besides all that
belongs to the species, everything that is peculiar to that in-
dividual.

CHAPTER III.

OF DIVISION.

NOTHING is more fitted to give us clear, distinct, and accurate
ideas of a complex object, than to reduce it to its component
parts. For this purpose division was invented. In its pro-
per acceptation it means actually to separate the parts of
which anything is composed; and each of these parts thus
physically divided must, of course, be absolutely less than
the whole. This is not the case, however, in a logical
division. Division, as employed in Logic, is a metaphori-
cal expression, signifying the separate enumeration of several
things expressed by one common term. The several parts
which compose the whole are here only enumerated; and each
of the members comprehends *more* than the whole. A tree
may be divided physically into root, trunk, branches, and
leaves; and each of these members must be less than the
whole tree. But if we divide logically a genus into its species,
each of these species comprehends more than the genus; for
it expresses not only the general notion of the genus, but its
own peculiar characteristic which makes it a species. Thus,
if the genus "tree" be divided logically into several species,
as oak, elm, ash, and so on: the word *oak*, or *elm*, or *ash*, com-
prehends not only the general notion of a tree, but also the
differentia which belongs to that particular kind of tree. Care,
therefore, must be taken not to confound a physical with a
logical division, otherwise the rules that have been laid down
for a good division will be misapprehended.

Logical division is the distribution of a whole into its several

parts. If it be a genus, it must be distributed into its species; if it be a species, into its individuals; if it is an individual, it is incapable of logical division, because it is, strictly speaking, only one object. The several partitions into which a whole is distributed are called the *parts* or members of the division. If our distribution be happy, it will greatly contribute to our gaining a complete knowledge of the thing divided : and for this purpose the following rules for division have been laid down :—

1. *Each of the parts, or any number of them short of all, must have a narrower signification than the thing divided.* Thus, " mineral " may be divided into " stones," " metals," and so on ; and " metals " again into " gold," " silver," " iron," because each of these, or any number of them short of all, contains less than the thing divided.

2. *All the parts together must contain neither more nor less than the whole.* Thus, " medicine " has been divided into the " means of preserving health," and the " means of restoring health ; " because there is no other kind of medicine besides these two. Everything that can be conceived of must either be " corporeal," or " incorporeal." In this way a complete two-fold division may be made of any subject so as to *exhaust it*, that is, to make the division adequate to the subject divided. To divide " metals " merely into " gold " and " silver " would be an imperfect division, because these parts together do not make up the whole.

3. *The parts must be opposed, not contained in each other.* If " book " were divided into " poetical, historical, folio, quarto, French, Latin," the parts would be contained in each other; because a poetical book might be a folio ; a quarto, French ; and a historical book, Latin. Men may be divided into " rich and poor," or " young and old," or " learned and illiterate ; " because these classes are opposed to each other.

4. *The natural order should be preserved in arranging the several members.* Thus, " animal " may be divided into " man," " beast," " bird," " fish," " insect ; " but were we to reverse, or disarrange this order, our enumeration would be faulty, because a subject should be distributed into its proximate and nearest members.

5. *When a subject can be divided in several ways, we should select the one most suitable for our purpose.* Thus, " mankind "

may be divided politically according to their civil character, as Lawyer, Merchant, Tradesman; or physiologically, as Negro, Mulatto, White-man ; or geographically, as European, African, American ; or theologically, as Christian or Pagan, Heathen or Mahometan. We must, therefore, determine at the commencement which principle of division will most suit our purpose, and adopt it in preference to all others.

CHAPTER IV.

OF DEFINITION.

DEFINITION literally signifies " laying down a boundary." In Logic it is used in a metaphorical sense to signify " an expression which explains any term, so as to separate it from everything else." It must be particularly remarked, however, that the object of a logical definition is not to give an adequate conception of the nature and essence of the object defined. This is in most cases impossible, from the limited nature of our present powers. Its chief use is to see that a term shall not be used in different senses in any process of reasoning. Of course, if there be no ambiguity in a term, there is no need to define it ; but, in those cases where definition is needed, the greatest assistance may be obtained from the rules which are laid down on this subject.

In a logical definition everything essential to the thing defined must be contained. This includes, first, what is common to it with other things of the same kind ; and secondly, that which distinguishes it from other things of the same kind :— in other words, its *genus* and its *differentia*. There are various kinds of definition, however, which must be clearly distinguished, otherwise we shall fall into confusion and error. Of these the following may be mentioned :—

1. *A Nominal Definition.* This has been called the *definition of the name,* and is merely the explaining the meaning of a term that is not clearly understood, by giving an equivalent expression which happens to be better known. Thus, " geo-

graphy " may be defined, " a description of the surface of the earth ; " " decalogue," the " ten commandments ; " a " triangle," " that which has three angles." These definitions are usually found in dictionaries.

2. *An Essential Definition*. This has been called by logicians the *definition of the thing*, and explains an object by pointing out its essential attributes. Thus, if called to define what the mathematicians call a square, we should say, " A square is a figure which has four equal sides, and four right angles." A circle, we should say, "is a plane figure contained by one line, which is called the circumference, and is such that all straight lines drawn from a certain point within the figure to the circumference are equal to one another." This kind of definition belongs to the science that is employed about the particular object defined ; and it is to be remarked, that in mathematics the Nominal and Essential definition exactly coincide—the meaning of the word, and the nature of the thing, are exactly the same. This is the case also in the definition of most scientific terms.

3. *A Logical Definition*. This kind of definition consists of two parts : the first part points out those objects with which the thing to be defined essentially agrees ; the second part points out those qualities which are peculiar to itself, and which distinguish it from all others :—in other words, a logical definition consists of the *genus* and *differentia* of the object defined. Thus, Logic may be defined, " the science of reasoning." The first part of this logical definition points out the *genus* to which Logic belongs—it is a *science ;* the second expresses its *specific difference*, or that which distinguishes it from all the other species included in that genus—it is employed about *reasoning*. " Wine is the juice of the grape ; " " man is a rational animal ; " " a flower is an organised being destitute of sensation : " in all these cases the object is logically defined by specifying the genus and the difference.

4. *An Accidental Definition*. By this is meant a *description*, or, as it is sometimes called, an *imperfect* definition, which is merely an enumeration of the accidental properties belonging to the object which we wish to define. A " landscape " may be described as containing corn-fields and meadows, hills and dales, running streams and lakes, villages,

houses, and animals, all situated in such a manner as to distinguish it from other landscapes. In a description, however, it is only the *non-essential* attributes of the object that you enumerate. In the above example, none of the particulars mentioned are essential to the existence of the landscape. They are necessary to distinguish it from other objects of the same kind ; yet it would continue to be a landscape were any of them taken away. They are mere *accidental* properties, which may, or may not, belong to it. In this way alone *individuals* can be defined. We must enumerate the accidents which distinguish one individual from another, and add the *species,* and then they are accurately described ; thus, " Philip was a *man* of Macedon, who subdued Greece." This kind of imperfect definition is resorted to when we cannot point out the *essential difference* of that which we wish to define. We collect its chief properties, and by enumerating them endeavour to communicate such an idea of it as may serve to distinguish it from all other objects. Thus, " silver " may be described as "white, hard, ductile, fusible, and next in weight to gold." In describing a *species* in this manner, nothing that is merely an *accident* must be mentioned ; because, if it does not belong to the *whole* of the species, it cannot clearly distinguish it from others. But in describing an *individual,* the *accidents* only can be enumerated, because it is by them that one individual differs from another. It must be observed, however, that the *differentia* is not always one quality, but is frequently made up of many, no one of which *alone* is sufficient to distinguish the object from all others. In this case a logical definition may be given which may seem to differ very little from a mere description. Thus, if it is said, "silver is white, hard, ductile, fusible, and next in weight to gold," this is merely a description ; but if we say, "silver is a *metal,* white, hard, ductile," and so on, this is a logical definition ; for we have here the *genus,* " metal," and the *differentia,* made up of the several qualities enumerated.

The principal rules for definition are the following :—

1. *A definition must be adequate.* By this is meant that it must neither be too extensive, nor too narrow, for the thing defined. Thus, if "insect" were defined, " an animal that flies," this would, in one sense, be too extensive, because it is

applicable to birds as well as to insects ; in another sense, it would be too narrow, because there are many insects that only creep. But " wine " may be defined "the juice of the grape ;" because this can be affirmed of no other substance, and yet it applies to all proper kinds of wine. When a definition is thus adequate, it is reciprocal with the thing defined, and they may be mutually affirmed of, or substituted for, each other. Thus we may say, " the juice of the grape is wine," or " wine is the juice of the grape."

2. *A definition must be clearer than the thing defined.* It must be expressed in language as plain and simple as the subject will allow. It may happen, indeed, that the term defined is to some persons more familiar than the definition given ; but nothing doubtful or difficult should be admitted into a definition, so that it may be generally and easily understood.

3. *It should be expressed in as few appropriate words as possible.* Too great brevity is not to be sought after, because, in this case, the subject may not be pointed out with sufficient definiteness ; on the other hand, prolixity must be guarded against, as this would confuse the mind. Doubtful and equivocal, obscure and synonymous terms ought also, for the same reason, to be avoided. In a perfect definition we should not indulge in figurative and metaphorical language, as this might lead to indistinctness and ambiguity. But in an imperfect definition, or description, figurative language may be very properly introduced.

PART II.

OF JUDGMENT.

THE second mental operation employed in reasoning is *Judgment*, which is the comparing in the mind any two ideas, whether complex or incomplex, and pronouncing whether they agree or disagree. Judgment is that exercise of the mind by which we carry on this process ; and when the decision which is thus formed is expressed in words it is called an enunciation, or a *proposition*. Under this head, then, Logic treats of the doctrine of Propositions.

CHAPTER I.

OF PROPOSITIONS.

A PROPOSITION is an act of judgment expressed in words, and is defined logically " a sentence indicative," that is, a sentence either affirming or denying ; " sentence " is the *genus*, and " indicative " the *difference*. No sentence is a proposition which does not either *affirm* or *deny*. For example, " Are you going to college ? " is a question ;—" Let them go to college," is a permission, request, or command ;— and, " Would that I were at college ! " is an exclamation ; but none of these is a proposition, because nothing is affirmed or denied in any of these sentences. But, " They are gone to

college," and, " They are not gone to college," are each a pro-
position ; because the one contains an affirmation, the other a
denial.

The above definition expresses the two parts of a proposi-
tion which cannot be separated from each other except in the
mind. But it may be, perhaps, more clearly pointed out by
mentioning its real parts which are actually separable. A
proposition consists, then, of a *subject,* a *predicate,* and a
copula. The *subject* is that respecting which anything is
affirmed or denied ; the *predicate* is that which is affirmed or
denied of the subject ; and the *copula* is some part of the
substantive verb " to be," expressed or understood, connecting
the subject and the predicate together. Thus, " Life is short,"
is a proposition, in which "life" is the subject ; " short," the
predicate ; and " is," the copula. It is not necessary, how-
ever, that each of these terms should be separately expressed ;
the same proposition may, in some languages, be expressed
by one, two, or three terms ; thus, " vivo," " Ego vivo," or
" Ego sum vivens," all express the same proposition. " The
mind thinks," is a complete proposition, although the copula
be not expressed, for it is equivalent to "the mind is think-
ing :" " I live," signifies " I am living :" " Troy was," means
" Troy was existing :" " I am," that is, "I am living." In
all these cases the subject, predicate, and copula are contained
in the proposition, and are easily found out by expressing the
proposition at length, and by asking the questions, "What am
I speaking of ?" and, "What am I saying respecting it ?" In
general, when the proposition is fully expressed, the subject
stands *first,* and the predicate *last,* in a sentence ; but this is
not necessary ; nor are they to be distinguished from each
other by the place they occupy in the sentence, but by care-
fully marking the import of the expressions, and the design of
the speaker. Thus, in the proposition, " Great is Diana of
the Ephesians," the predicate " Great " stands first, and the
subject, " Diana of the Ephesians," comes last in the sentence.
" It is proper to study Logic ;" here the subject stands last,
and the predicate first ; as may be seen by expressing the
proposition in the more usual way ; thus, " To study Logic is
proper." The properties of these propositions merit particu-
lar attention. We shall first consider the *Classes* into which

they have been arranged, and then notice their important *Affections* or relations.

CHAPTER II.

OF THE CLASSES OF PROPOSITIONS.

1. PROPOSITIONS, considered as *sentences*, are either *categorical* or *hypothetical.* A proposition may be expressed either *absolutely,* or under a *hypothesis;* and on this distinction the above division is founded. Thus, "Cæsar deserved death;" "Crassus was rich;" "Solomon was wise:" all these are *categorical* propositions, because they express the truth they contain in an absolute unconditional form. But, "If Cæsar was a tyrant, he deserved death;" "If Crassus was rich, his temptations to pride were numerous;" "If Solomon was wise, his instructions should be regarded:" these are *hypothetical* propositions, because they are expressed in a conditional form, or in a hypothesis.

2. Propositions, with regard to their *form,* are either *pure* or *modal.* When a proposition asserts simply or purely that the subject does or does not agree with the predicate, it is called a *pure* proposition. But when it includes also the *mode* or manner in which the predicate is connected with the subject, it is called a *modal* proposition. Thus, "Brutus killed Cæsar," is a pure proposition; but, "Brutus killed Cæsar *justly,*" is modal. "Intemperance will induce disease," is pure; "Intemperance will *probably* induce disease," is modal.

3. With regard to their *matter,* propositions must either be *true* or *false.* When the terms in which it is expressed agree with the thing signified, the proposition is *true;* when they do not agree, it is *false.* Hence a proposition must not be *ambiguous,* for in that case it has more than one meaning, and is in reality not one proposition but several; nor must it be *imperfect* or *ungrammatical,* for such an expression has no meaning at all. When a proposition is properly expressed, it is impossible it can be both true and false at the same time,

and in the same sense; yet two propositions, though both true, may seem to contradict one another, when used in different senses, or in different respects. Thus, *man* may be said to be both "mortal" and "immortal;" applying the one to his body, the other to his soul. Many seeming contradictions may be in this way explained.

4. With regard to their *quality*, propositions must either be *affirmative* or *negative*. They are *affirmative* when the predicate is said to agree with the subject; thus, "Man is an animal." They are *negative* when the predicate and subject do not agree; thus, "Man is not a tree." An affirmative proposition may be known by its *copula* being affirmative; thus, "Man is mortal;" "Not to advance is to retrograde;" a negative proposition, on the contrary, is one whose *copula* is negative; as, "Man is not perfect;" "No man is innocent;" or, "Man is not innocent."

5. In respect of *quantity*, propositions are either *universal* or *particular*. When the predicate is affirmed or denied of the *whole* of the subject, the proposition is *universal:* when it is affirmed or denied only of a *part* of it, it is *particular;* thus, "All circles are figures;" "Ireland is an island;" "No tyrant is happy," are *universal* propositions; and their subjects are said to be *distributed,* that is, each of them is understood to stand for the *whole* of its significates: but, "Some figures are squares;" "Some islands are fertile;" "All men are not just," are *particular* propositions; their subjects are not distributed, being understood to stand only for a *part* of their significates. *Universal* propositions are generally denoted by the words, "all," "none," "every;" and *particular* propositions by "some," "many," "a few," and so on.

6. When the subject of a proposition is a common term, without any of the universal or particular signs expressed with it, the proposition is called *indefinite;* and the *quantity* of the proposition must be ascertained by the *matter* of it, or in other words, by the nature of the connexion between the extremes. This may be either *necessary,* or *impossible,* or *contingent.* If the matter of an indefinite proposition be *necessary* or *impossible,* the proposition is understood as a *universal;* thus, "Birds have wings," that is, "All birds have wings:" in this case the connexion between the extremes is *necessary.*

" Birds are not quadrupeds :" in this instance the connexion is *impossible*, and therefore the subject is distributed; that is, it asserts that " *no* bird is a quadruped." In *contingent* matter, where the terms may or may not agree, an *indefinite* proposition is understood as a *particular ;* thus, " Food is necessary to life," that is, *some* food ; " Birds sing," that is, *some* birds sing ; " Animals are not quadrupeds," that is, *all* animals are not, or *some* are not quadrupeds.

7. Another class of propositions consists of those denominated *singular* propositions. Those whose subject is either a *proper name*, or a common term with a *singular* sign, are thus called; and they are considered *universals*, because in them we speak of the *whole* of the subject. When we say, " Plato was a philosopher," we mean the whole of Plato. If any qualifying term is inserted to indicate that the whole of the subject is *not* to be included, the proposition may be viewed as *particular ;* thus, " This man is not *wholly* a philosopher ;" " Cæsar was not *altogether* a tyrant ;" " I shall not *wholly* die." Singular propositions, however, are most naturally accounted universals;—it is only when modified as above that they can be contradicted.

Of all these divisions the most important are those which class propositions into *affirmative* or *negative, universal* or *particular ;* because, considered as to their quality and quantity, every pure categorical proposition must be included in these four divisions. Every proposition is either *affirmative* or *negative ;* and must either be *universal* or *particular ;* they are, therefore, ranged under four great classes—viz., *Universal Affirmatives, and Universal Negatives; Particular Affirmatives, and Particular Negatives.* These are denoted, for the sake of brevity, by the symbols, A, E, I, O : thus, A, denotes a universal affirmative ; E, a universal negative ; I, a particular affirmative ; and O, a particular negative. To aid the memory, the following couplet is usually given, embodying the above symbols :—

> Asserit A, negat E, verum generaliter ambo.:
> Asserit I, negat O, sed particulariter ambo.

It must be particularly remembered that in every *universal* proposition, *the subject* is distributed, that is, is taken in the

whole of its extension ; but never in a *particular* proposition. But the distribution, or non-distribution of the *predicate,* does not depend on the *quantity,* but on the *quality* of the proposition. If any part of the predicate agrees with the subject, it must be *affirmed* of it, and cannot be denied of it. In an *affirmative* proposition, then, it is sufficient that *some part of the predicate* agrees with the subject ; but in a *negative* proposition, it is necessary that the *whole* of the predicate should *disagree* with the subject ; thus, it is true that "to study Logic is useful," although the whole of the *predicate* "useful" does not agree with the subject ; for many things are useful besides the study of Logic. On the other hand, "No vice is useful" would be false, if any part of the *predicate* "useful" agreed with the term *vice* ; that is, if there were any one thing really useful which was a vice. The rules to be observed, then, respecting distribution are these :—

1. All *universal,* but no *particular* propositions, distribute the *subject.*

2. All negative, but no *affirmative* propositions, distribute the *predicate.*

3. Whatever is universally affirmed or denied respecting any term distributed, may be equally affirmed or denied respecting everything contained under that term : thus, if anything is affirmed or denied *universally* respecting "animal," it may be equally affirmed or denied of *any* animal ; of "man," "brute," "Alexander," "Bucephalus." This rule is generally expressed thus, "*Dictum de omni et de nullo.*"

The *converse* of a proposition is made by interchanging the subject and the predicate. In an *affirmative* proposition, the predicate enters *partially ;* in a *negative* proposition, it enters *wholly.* Hence the converse of a true proposition is not necessarily true. For instance, it is true that "all horses are animals ;" but it is not true that "all animals are horses." The first proposition here is affirmative, in which we spoke of "all horses," but not of "all animals." Hence in the converse, we are not entitled to speak of "all animals," but only of "some animals." The assertion that "all horses are animals," does not imply that *all,* but only *some* animals are horses.

These remarks on propositions may be illustrated by diagrams. Take the example, "Every horse is an animal." If

we suppose all horses enclosed in a triangle, and all animals in a circle, then the preceding assertion, if true, would require that the whole triangle be contained in the circle.   Thus :—

Here the whole of the be other animals besides horses are spoken of; horses ; therefore the tri-hence the whole of the angle does not occupy triangle is within the the whole of the circle. circle.   But there may If we *convert* the original proposition, in which we did not speak of *all* " animals," but only of a part of them, we must limit the term " animals " by prefixing the word " some ;" and we see in the diagram that *some* of the circle coincides with the triangle, whilst *all* the triangle coincides with a *part* of the circle.

Take the proposition, " Some islands are fertile."   If we enclose all the islands in a triangle, and all places that are fertile in a circle, a portion only of the triangle is asserted to be within the circle.   Thus :—

On the right margin, and on the left, a greater or smaller amount of the triangle may be included.   The pro-position does not state how much of the triangle is within the circle ; or how much is out of it ; or whether the whole is contained in it.   As the predicate " fertile " is not taken in its whole extent, we must prefix the word " some " if we would *convert* the proposition.   If " some islands are fertile," then " some fertile places are islands."   If some of the triangle coincides with the circle, then some of the circle coincides with the triangle.

Take the proposition, " No tyrants are happy."   If you enclose all tyrants in a triangle, and all the men who are happy in a circle, the triangle will be wholly outside of the circle. Thus :—

Here the whole of position, which may the happy are referred be converted without to, as well as the limiting the terms. whole of the tyrants. If " *no* tyrants are It is a *negative* pro- happy," we are not
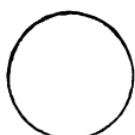
merely entitled to say, " *Some* happy men are not tyrants," but
" *No* happy men are tyrants." None of the triangle coincides
with the circle, and therefore none of the circle coincides with
the triangle.

Lastly, Take the proposition, " Some islands are not fertile."
Enclose the islands in a triangle, and the fertile places in a
circle ; then, at least a portion of the triangle must be outside
the circle. Thus :—

But the proposition it necessarily imply that
does not declare what any of them are fertile
proportion of the islands at all. · If we would re-
is unfertile, and what present by a diagram
the reverse ; nor does the proposition that
" some men are not winged animals," we must place not only
part, but the whole of the triangle comprising the human
race, outside of the circle enclosing winged animals ; for we
know, not from this proposition, but from other sources of
knowledge, that no men are winged creatures.

CHAPTER III.

OF THE AFFECTIONS OF PROPOSITIONS.

WE now proceed to consider the *Affections,* or relations of
propositions, which is that property by which they undergo
various mutual changes. It must be remembered that a pro-
position is either universal or particular according to its
quantity ; and affirmative or negative according to its *quality ;*
and that these are denoted, A, *universal affirmative ;* E, *uni-
versal negative ;* I, *particular affirmative ;* and O, *particular
negative.* These four classes may be exemplified thus :—

A, Every vine is a tree ;
E, No vine is a tree.
I, Some vine is a tree ;
O, Some vine is not a tree.

Any given subject and predicate may thus form four dis-

tinct propositions ; and these may undergo various changes
by which one proposition may be substituted for another. A
knowledge of these changes is of considerable importance in
all kinds of argumentation. Of these the following are to be
noticed—*Subalternation, Conversion,* and *Opposition.*

SECTION I.

Of Subalternation.

Subalternation is the substituting a *particular* proposition
for a *universal,* when they agree in *quality ;* thus,

> A, All men are mortal ;
> I, Some men are mortal.

Or thus,

> E, No tyrants are happy ;
> O, Some tyrants are not happy.

In subalternation the *universal* proposition is called the
subalternans ; and the *particular,* which is substituted for it,
is called the *subalterna.* In this case the propositions differ
in *quantity* alone : and the maxims laid down in reference to
propositions affected in this manner are :—

1. That the *truth* of the *particular* proposition is contained
in the *truth* of the *universal.*

2. The *falsity* of the *universal* in the *falsity* of the *par-
ticular.*

3. Whether *universal* or *particular,* they may be either
both true or *both false,* or the *one true* and the *other false.*

SECTION II.

Of Conversion.

*Conversion of propositions is the transposing of their terms,
so that the subject is made the predicate, and the predicate the
subject :* thus,

> Samson was the strongest man ;
> The strongest man was Samson.

It is to be remembered that no conversion is permitted for any logical purpose unless it be *illative;* that is, except the truth of the one proposition is implied in the truth of the other; or, as it is expressed, *the truth of the Converse is implied in the truth of the original proposition, or Exposita.* Though the term *illative* is used in reference to conversion, it is not to be supposed that this conversion is a process of *reasoning:* it is in fact only *modifying* a proposition, or stating the *same* judgment in another form. Thus :—

> No virtuous man is a rebel;
> No rebel is a virtuous man.
> Some boasters are cowards;
> Some cowards are boasters.

No conversion is allowed but that which is thus *illative* or legitimate; for in that case a term would be used *universally* in the one case, which was used only *particularly* in the other. There are some propositions which distribute both terms; these, therefore, can easily be converted, while they continue to preserve both their quantity and their quality. This cannot, however, be done in all cases : conversion is, therefore, modified so as to be applicable to these cases; and the names given to these various kinds of conversion are, *Simple Conversion; Conversion per accidens; and Contraposition.*

1. *Simple Conversion takes place when the quantity and quality of the propositions converted remain unchanged;* thus :—

> E, No man is a quadruped;
> E, No quadruped is a man.
> I, Some tree is a vine;
> I, Some vine is a tree.

In these cases the subject and predicate merely change places; and in this way *E,* and *I,* that is, all *universal negatives* and *particular affirmatives,* may be converted with preservation of truth.

2. *Conversion per accidens.* This takes place when the *quality* of a proposition is preserved, and the *quantity* is changed. In some propositions the predicate is not distributed; in these cases, therefore, their simple conversion would not be illative, because there would be a term dis-

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tributed in the *converse* which was not distributed in the *ex-posita*. Thus we cannot infer, because "all men are animals," that "all animals are men," because the term "animals" is distributed in the last instance, being the *subject* of a *universal* proposition; but not in the former, where it is the *predicate* of an *affirmative* proposition. We must therefore limit its *quantity* from *universal* to *particular*, and then the conversion will be legitimate. Thus :—

> A, All men are animals ;
> I, Some animals are men.

This is sometimes called conversion by *limitation;* but it is generally known as *Conversion per accidens;* and in this way *A* and *E*, that is, *universal affirmatives* and *universal negatives*, may be converted ;—though, in the last case, the statement is less than you are warranted to make. Thus :—

> E, No man is a quadruped ;
> O, Some quadruped is not a man.

3. *Conversion by Contraposition.* This takes place when the term that is the *contradictory of the predicate* is put for the *subject*, and the *quality* of the proposition is changed. In particular negatives, since the predicate of a negative proposition is always distributed, whether the *quantity* be changed or not, there will still be a term distributed in the converse which was not distributed before : the *quality*, therefore, must be changed, without altering the sense, by considering the negative as attached to the *predicate*, instead of attached to the *copula*, and then the proposition may be regarded as a *particular affirmative;* for example :—

> O, Some men are not wise.

This is a *particular negative*, the predicate of which is "wise ;" take, then, the contradictory of this predicate, viz., "not-wise," and make this the subject of the proposition ; it will then become a *particular affirmative*, which may be converted illatively by simple conversion. Thus :—

> I, Some who are not-wise are men.

This may be named conversion by *negation;* it is, how-

ever, generally called *Conversion by Contraposition.* In this way, *O,* that is, *particular negatives,* may be converted. But *A,* that is, *universal affirmatives,* may also be converted by this method ; for to *assert* the *presence* of some attribute, is the same thing as to *deny* its *absence.* Thus :—

<blockquote>A, Every animal is sentient ;</blockquote>

this is equivalent in sense to,

<blockquote>E, No animal is not-sentient ;</blockquote>

which being E, can be illatively converted.

In these three ways every proposition may be illatively converted ; and to aid the memory, all these rules of conversion have been laid down in the following lines :—

<blockquote>Simpliciter *feci,* convertitur *eva,* per accid. ;
*A*sto per contra, sic fit conversio tota.</blockquote>

The two vowels in *feci* represent E and I, which are converted *simply ;* the two vowels in *eva* denote E and A, which are converted *per accidens ;* and the two vowels in *asto* stand for A and O, which are converted by *contraposition.*

———

SECTION III.

Of Opposition.

Another affection of propositions is called *Opposition.* This takes place when two propositions, having the same subject and predicate, differ in *quantity,* or *quality,* or *both.* With any given subject and predicate four distinct propositions may be made, any *two* of which may be said to be opposed ; but there are only three kinds of opposition properly so called— *Contradictory, Contrary,* and *Subcontrary.*

1. *Contradictory Opposition takes place between two propositions when the one is universal, and the other particular ; the one affirmative, and the other negative.* Thus :—

> A, Every man is an animal ;
> O, Some man is not an animal.   Or,
> E, No vine is a tree ;
> I, Some vine is a tree.

In this kind of opposition we infer from the truth of the one the falsity of the other : for they can never be both true, or both false, at the same time.

2. *Contrary Opposition takes place between two universal propositions, of which the one is affirmative, and the other negative;* thus :—

> A, Every man is wise ;
> E, No man is wise.

In this kind of opposition the propositions may be both false at the same time, but they cannot both be true.

3. *Subcontrary opposition takes place between two particular propositions, of which the one is affirmative, and the other negative;* thus :—

> I, Some horses are swift;
> O, Some horses are not swift.

In this kind of opposition both propositions may be true at the same time, but they cannot both be false.

If the *quantity* and *quality* of a proposition be known, it is evident that its truth or falsity must depend on its *matter*. The following rules have therefore been laid down respecting the *matter* of propositions, which must be carefully remembered.

1. In *necessary matter all affirmatives are true, and negatives are false.* Thus, " *all* islands," or " *some* islands, are surrounded by water," must be true ; because the *matter* is necessary ; and to say, " *no* island is surrounded with water," or " some islands are *not* surrounded by water," would be false, for the same reason.

2. *In impossible matter all negatives are true, and affirmatives false.* Thus, " all circles," or " some circles, are squares," is false, because the *matter* of these propositions is impossible ; but " all circles," or " some circles, are *not* squares," is true, for the same reason.

3. *In contingent matter all universals are false, and par-*

ticulars true. Thus, " *some* islands are fertile," or, " *some* horses are not swift," are both true, because they are particular propositions, and the matter is contingent ; but, " *all* islands are fertile," or, " *all* horses are not swift," are both false, because they are universals, and the matter contingent. Hence in *contingent matter* contradictories will always be *one true,* and the *other false;* contraries may be *both false,* but never *both true ;* subcontraries, *both true,* but never *both false ;* and subalterns, *both true,* or *both false;* or the *one true,* and the *other false.*

All the maxims relative to the Affections of Propositions have been arranged into the following scheme, in which the four classes of propositions are expressed by their symbols ; the different kinds of matter by the contractions, necess., imposs., conting. ; and the truth or falsity of each proposition, in each kind of matter, expressed at length :—

necess. true.   A——Contraries.——E   necess. false.
imposs. false.   imposs. true.
conting. false.   conting. false.

necess. true.   necess. false.
imposs. false.   imposs. true.
conting. true.   I——Subcontraries.——O conting. true.
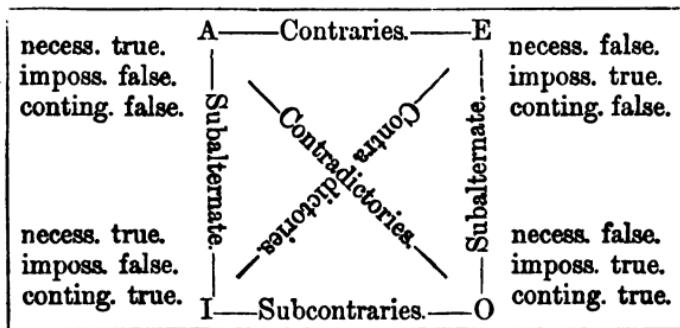
PART III.

OF REASONING.

THE third operation of the mind employed in argumentation is *Reasoning,* which is that process by which we *infer* or deduce a conclusion from given premises. It often happens that we cannot at once perceive the relation which subsists between our ideas; we, therefore, compare them with some common medium, and, from their agreement or disagreement with this medium, decide whether or not they agree with each other. In this way we draw inferences; and when the process is regularly carried on, it is called *Discourse* or *Reasoning.*

It is to be particularly kept in mind, that in every instance in which we reason, whether it be to refute an adversary, or to convey instruction, or to satisfy our own minds on any particular subject, a certain process takes place in the mind, which is, when correctly carried on, in all cases, and on all subjects, one and the same. Every one may not be aware of this process, nor be able to explain the principles on which it proceeds; but this is not to be wondered at. It is the case with all our mental operations, and with every process that has been reduced to regular system. The practice must have preceded the theory—just as men must have been able to speak grammatically before Language was reduced to a system of Grammar. It is indeed customary to speak of *mathematical* reasoning, and *metaphysical* reasoning, and *political* reasoning, and *theological* reasoning, as if they were essentially different. But these are not *different kinds* of reasoning, founded on different principles. The process is the same in all these instances;

and it is no more affected by the *nature* of the subject to which it is applied, than is an arithmetical process affected by the nature of the objects that are the subject of calculation.

If, then, the process of reasoning is in all cases the same, it must be an interesting employment to analyse this operation, and become acquainted with the principle on which it rests, and the laws by which it is regulated; and since an unsound and inconclusive mode of reasoning is often employed, it must be of great service to be acquainted with some general rules, applicable to all cases, which may be employed either to convince, or to confute; and by which we may judge of the validity of any reasoning process. This is what Logic furnishes. Its principal object is to guard us against inconclusive reasoning. The third part of Logic, therefore, treats of *Argumentation*, which is Reasoning expressed in words. When an argument is stated *at full length*, and in its *regular form*, it is called a *syllogism;* the nature and properties of the Syllogism must, therefore, now be considered.

CHAPTER I.

OF THE SYLLOGISM.

EVERY Argument consists of two parts; that which *is proved*, and that *by means of which* the proof is given. The former, before it is proved, is called the *question;* but after it is proved, it is called the *conclusion*. The means of proof, if stated *last*, is called the *reason;* but if stated *first*, it is called the *premises*. Every conclusion is deduced from *two* premises, either expressed or understood, which are granted to be true, and from which the conclusion necessarily results or follows. A syllogism has therefore been defined, "an argument so expressed, that the conclusiveness of it is manifest, from the mere form of the expression, without considering the meaning of the terms in which it is expressed." Thus, in the syllogism, "A is B : C is A; therefore, C is B;" the

conclusion is inevitable, whatever the terms A, B, C, may be considered respectively to indicate.

The order generally observed in stating a syllogism, is first to lay down the premises, and then to draw the conclusion; thus,

> All A is B:
> All C is A; therefore,
> All C is B.   or,

> All tyrants deserve death:
> Cæsar was a tyrant; therefore,
> Cæsar deserved death.

Every syllogism has only *three terms*,—denoted above by the symbols A, B, C,—viz., the middle term, and the two terms found in the conclusion; for though each syllogism has three propositions, and each proposition has three terms, yet, it will be seen, by examining the above syllogism, that each term occurs twice in every syllogism. The *middle term*, A, is the medium of comparison with which each of the terms is separately compared, in order to ascertain their agreement or disagreement with each other. The other two terms, B and C, are called the *extremes*, and are always found in the *conclusion*, in the following order :—

1. The *subject* of the conclusion, C, is called the *minor term;* and,—

2. The *predicate* of the conclusion, B, is called the *major term*, because it has the greater extension.

Every syllogism has only *three propositions :*

1. The proposition in which the *major term* is compared with the middle term, is called the *Major premise.*

2. The proposition in which the *minor term* is compared with the middle term, is called the *Minor premise.*

3. The proposition in which the *minor term* is compared with the *major term*, is called the *Conclusion*, because concluded from the other two propositions, which are called the *Premises.*

These several parts of a syllogism will be best illustrated by an example; take therefore the following :—

> Every reasonable being is accountable :
> Man is a reasonable being ; therefore,
> Man is accountable.

This syllogism consists of three propositions; the first and the second are the *premises;* the third is the *conclusion.* "Man" is the *subject* of the conclusion, and is therefore the *minor term;* "accountable" is the *predicate* of the conclusion, and is therefore the *major term;* and "reasonable being" is the *middle term,* because it is with this that the other two terms are compared. In the *first* proposition the *major term* is compared with the *middle term;* it is therefore the *major premise.* In the *second* proposition the *minor term* is compared with the *middle term;* it is therefore the *minor premise.*

The validity of such a syllogism may be made evident to the eye by means of a diagram. Thus :—

> Every X is B :
> Every A is X ; therefore,
> Every A is B.

Enclose the A's (the minor term) in a triangle; the B's (the major term) in a square; and the X's (the middle term) in a circle :—then if the circle be contained in the square, as on the right margin; and the triangle in the circle, as on the left, it follows that the triangle must be contained within the square, thus :—
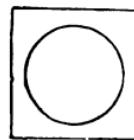
The conclusion of the foregoing syllogism is a *universal affirmative;* that is to say, the class of things denoted by the *predicate* is asserted to contain the *whole* of the things denoted by the *subject.* The following has a *universal negative* as its conclusion. Thus :—

> No X is B :
> Every A is X ; therefore,
> No A is B.

This may be represented by a diagram, thus : where all the
X's in the circle are outside of the square
containing the B's; whilst all the A's in
the triangle are included within the circle
of X's : hence the square and the triangle
have no portion in common.
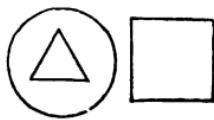
The conclusion in the next example is a *particular affirma-
tive.*   Thus :—

<div style="text-align:center">

Every X is B :

Some A's are X ; therefore,

Some A's are B.

</div>

This may be seen in the diagram on the right margin, or
on the left.   The whole semicircle of X's is
contained in the square of B's ; therefore so
much *at least* of the triangle of A's as falls
within the semicircle, must also fall within
the square.

The conclusion in the next example is a *particular negative.*
Thus :—

<div style="text-align:center">

No X is B :

Some A's are X ; therefore,

Some A's are not B.

</div>

Here the whole circle of X's is excluded from the square
of B's ; hence whatever por-
tion of the triangle of A's
falls within the circle, must
be outside of the square.
The propositions of the syllogism do not inform us whether
or not the triangle and the
square coincide in any other
portion of their extent.   The
argument may be represented
thus, as on the right margin ; or thus, as on the left.   Or thus,
as on the right margin ; or thus, as on the left.
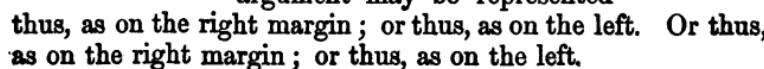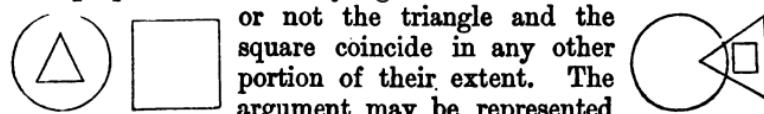
CHAPTER II.

OF THE LAWS OF SYLLOGISMS.

THE axiom on which the validity of the Syllogism depends is called "dictum de omni et nullo;" that is, "whatever is predicated of a term distributed, whether affirmatively or negatively, may be predicated, in like manner, of everything contained under that term." Thus, in the former example, B is predicated of A taken in the whole of its extension; and C is contained under A; therefore C is predicated of B; that is to say, "to deserve death," is predicated of "tyrants" distributed, or *all* tyrants; "Cæsar" is contained in this number; therefore, to "deserve death" is predicated of him. This axiom may be ultimately applied to all arguments, and it is by their conformity to this rule that their validity must be ascertained. It cannot, however, be applied immediately even to all pure categorical syllogisms, except they be reduced to a particular form. To avoid the tediousness of doing this, two other axioms are commonly adopted, on which depends the validity of affirmative and negative conclusions. These are—

First, "*If two terms agree with one and the same third, they agree with each other.*" On this Canon rest the validity of *affirmative* conclusions.

Second, "*If one term agrees, and another disagrees, with one and the same third, they disagree with each other.*" On this rests the validity of *negative* conclusions.

The two terms which are thus each compared with the same third are the *Extremes* of the conclusion; that is, the *major* term, and the *minor* term: and the third term, with which they are severally compared, is the *middle* term. No categorical syllogism can be faulty which does not violate one of these canons; and none can be correct that does. Hence, on these axioms are built all the general rules which are given below, and by which we may ascertain whether syllogisms are valid arguments or not.

The general rules laid down for the construction of syllogisms are the following :—

1. *The middle term must not be taken twice particularly,*

but must be distributed at least once in the premises. If the middle term be not distributed, it stands only for a part of its significates ; hence it may happen that one of the extremes may be compared with one part of it, and the other compared with another. In this case there are, therefore, *two middle terms ;* and the extremes not being compared with the same, cannot be conclusively compared with each other. Thus :—

> Some men are wise :
> Some men are ignorant ; therefore,
> Some ignorant men are wise.

In this case the middle term " men " being taken *particularly* both in the major and minor propositions, there is no distribution of any term. It is not the same persons that are spoken of in these two propositions. There are, therefore, in fact, *two* middle terms, or *four terms* in the syllogism ; it is not, therefore, a valid argument.

This may be illustrated by a diagram.

> Some A are X :
> Some B are X ; therefore,
> Some B are A.

Put some A in a triangle ; and some B in a square. If we say that the triangle is contained in a circle, and that the square is contained in a circle, we do not prove that the triangle and the square coincide in any part of their extent ; for they may stand in different parts of the circle : thus :—

This pretended argument is similar to the following, the inconclusiveness of which is at once apparent :—

> A horse is an animal :
> A sheep is an animal ; therefore,
> A sheep is a horse.

Again :—

> White is a colour :
> Black is a colour ; therefore,
> Black is white.

Here the middle term " colour " is not distributed ; and the terms of the conclusion are compared, one with one part of it,

and the other with another. And hence, not being compared with the same, they cannot be conclusively compared with each other. Again :—

> All vegetables grow :
> An animal grows; therefore,
> An animal is a vegetable.

It may be remarked, also, that the middle term must not be an *ambiguous term*, used in different senses ; for, in this case, there will be *two* middle terms *in sense*, though only *one in sound :* for example :—

> *Light* is contrary to darkness :
> Feathers are *light;* therefore,
> Feathers are contrary to darkness.

A term so glaringly equivocal as this could not, of course, be employed except in jest ; and could not impose on even the most ignorant. But the equivocation, though quite sufficient to vitiate the reasoning, is often so slight as to escape notice. If the middle term be used in *two* senses, however small the difference may be, the argument is inconclusive. This is the most fruitful soil for deception ; and though no rules can be laid down for detecting and avoiding *all* ambiguity, it is of importance to know where to seek for this source of error. First state your argument in the form of a syllogism ; then look at the *middle term*, and observe whether *that* is used in precisely the same sense in each premise. If the middle term be *univocal*, there will be little danger of inconclusive reasoning from any ambiguity in the major or minor term, since each of these will naturally be understood in the conclusion in the same sense as in the premises.

In every case, then, the *middle term* must be distributed at least once in the premises,—by being either the *subject* of a *universal*, or the *predicate* of a *negative* proposition : and if the middle term be distributed *once*, this is sufficient ; because, if one extreme has been compared to a *part* of the middle term, and another extreme compared to the *whole* of it, it is evident they must have been both compared to the same ; and consequently, they can be conclusively compared with each other.

2. *No term must be distributed in the conclusion which was not distributed in one of the premises.* Particular propositions are contained in universals, and, therefore, can be inferred from them; but universals are not contained in particulars; we cannot, therefore, infer a universal from a particular. But if a term is distributed in the conclusion, which was not distributed in one of the premises, this is to draw a universal from a particular;—it is to employ the *whole* of a term in the conclusion, when you had employed only a *part* of it in the premises; and thus, in reality, to introduce a fourth term. When this rule is violated, it is called an *illicit process*, either of the *major* or of the *minor term.* Thus :—

> A man is an animal :
> A bird is not a man ; therefore,
> A bird is not an animal.

Here there is an *illicit process* of the *major term.* In the major proposition, " animal" is taken only in a *part* of its extension, because it is the *predicate* of a *universal* proposition, the predicate of which is never distributed ; whereas, in the conclusion, being the *predicate* of a *negative* proposition, it is distributed.

Apply the Universal Principle of Reasoning to this argument, and it will be seen to be faulty :—

> A is B :
> C is not A ; therefore,
> C is not B.

Here the whole class of A is affirmed to be B ; and therefore anything contained in the class must also be B. But other things besides those in the class of A may also be in B ; and no reason is assigned why C may not be one of these other things. Represent the case in a diagram, thus :—Put A in a triangle ; and C in a circle ; and let B be a square ; then, though the circle is not in the triangle, it may find a place in the square, thus :—

This unsound argument is like the following :—" I ought to love my relatives : this man is not my relative ; therefore, I ought not to love him."

> All tyrants are cruel :
> All tyrants are men ; therefore,
> All men are cruel.

In this instance there is an *illicit process* of the *minor ;* because " men," being the predicate of a universal proposition in the minor proposition, is *not* distributed ; whereas, in the conclusion, being the subject of a universal proposition, it *is* distributed.

3. *From two negative premises no conclusion can be drawn.* In this case the middle term is affirmed to disagree with both extremes ; they cannot, therefore, be compared together : for, when two ideas disagree with a third, we cannot infer either that they agree or disagree with each other. Thus, if it be affirmed,

> A fish is not a quadruped ;
> A bird is not a quadruped ;

nothing is proved ; and, therefore, no conclusion can be drawn. But when the negative is a part of the middle term, it must be remembered that, though the proposition may appear to be negative, it is in reality an affirmative, and in that case a conclusion can be justly drawn. Thus :—

> What has no wings cannot fly :
> A dog has no wings ; therefore,
> A dog cannot fly.

In this instance the middle term, " the-having-no-wings," is predicated of a dog in the minor proposition ; it is, therefore, an affirmative, though it may seem to be a negative proposition, and hence the inference can be conclusively drawn.

4. *If one premise be negative, the conclusion will be negative.* In a negative premise, the middle term is pronounced to disagree with one of the extremes ; and the other premise, which must be, by the last rule, affirmative, is pronounced to agree with the other extreme. They, therefore, disagree with one another ; and as in this case they never can agree, the conclusion must be negative.

5. *From two particular premises nothing can be concluded.* If the two premises are affirmative, there will be no universal

terms, and hence the middle term will not be distributed, contrary to the first rule.

If the one be negative, and the other affirmative, there will be an illicit process. Thus :—

> Some animals are sagacious :
> Some beasts are not sagacious ; therefore,
> Some beasts are not animals.

6. *If one of the premises be particular, the conclusion will be particular.* To infer a universal conclusion would be an *illicit process :* for, supposing both premises to be *affirmative,* if you draw a universal conclusion, you will have a term distributed in the conclusion which was not distributed in one of the premises. Thus : from, " Every A is B : Some C is A ;" you can only conclude, " *Some* C is B ;" since to infer, " *Every* C is B," would be an illicit process of the minor term. Thus :—

> Every contented man is happy :
> Some rich men are contented ; therefore,
> Some rich men are happy.

Again ; if one premise be *negative,* there are two particular terms in the premises ;—the *predicate* of the *affirmative* proposition, and the *subject* of the *particular ;* the *predicate* of the conclusion will therefore be a universal, and its *subject* particular, and hence the conclusion itself will be particular. Thus : from, " No A is B : Some C is A ;" you are only warranted to conclude, " Some C is not B." For example :—

> No discontented men are happy :
> Some rich men are discontented ; therefore,
> Some rich men are not happy.

The last two rules are sometimes embodied in this one :—
" The conclusion follows the weaker part ;" because, negatives and particulars are considered inferior to affirmatives and universals.

It is to be remarked, that, although from two universal premises a universal conclusion may be generally inferred, yet this is not the case always. Thus :—

> All human beings ought to be educated :
> All children are human beings ; therefore,
> All children ought to be educated.

This *universal* conclusion is legitimate. But in the following example we can only draw a *particular* conclusion :—

> All crystal is transparent :
> All crystal is a mineral ; therefore,
> *Some* mineral is transparent.

When a universal *can* be inferred, we are always at liberty to infer a particular ; since whatever is predicated of *all*, may of course be predicated of *some.*

To aid the memory the foregoing rules have been summed up in the following lines :—

> Distribus Medium, nec quartus terminus adsit ;
> Utraque nec præmissa negans, nec particularis ;
> Sectetur partem Conclusio deteriorem ;
> Et not distribuat nisi cum Præmissa, negetve.

Every syllogism that violates none of these laws, must be considered valid.

Some arguments are sound, and some are not. The conclusion may be false, though the reasoning is correct. In these cases the error lies in the premises, which sense and intelligence will enable us to detect. Again, the conclusion may be true in point of fact, but the reasoning incorrect. This will be found out by analysing the process ; and for this purpose, symbolical letters and diagrams are of great use. First state the argument in the form of a syllogism. Then ascertain what is the *subject* of the conclusion, and represent it by the letter A, or a triangle. Represent the *predicate* of the conclusion by the letter B, or a square. The other term in the syllogism—which does not appear in the conclusion—is the *middle term;* represent it by the letter X, or a circle. Take the following as an example : " All wise rulers endeavour to civilise the people. Alfred endeavoured to civilise the people ; therefore King Alfred was a wise ruler." The conclusion here is correct in fact, but the reasoning is not valid. To make this apparent, just write down the *terms*, with their symbols. Thus : " Alfred " is the *subject* of the conclusion ; " a wise

ruler" is the *predicate* of the conclusion; the *middle term* is
"those who endeavour to civilise the people."

A or   △   = Alfred.

B or   □   = wise ruler.

X or   ◯   = those who endeavour
                       to civilise the people.

Having thus ascertained the terms, next proceed to repre-
sent the propositions. First determine what is "the question."
It is, "Whether Alfred was a wise ruler?" The answer given
by this argument is in the affirmative: "King Alfred was a
wise ruler."

"A is B"—or the triangle is in the

square; thus,

Now, examine whether this conclusion is legitimately de-
ducible from the premises, which are these: "All wise rulers
endeavour to civilise the people."

All B's are X—or the square is in

the circle; thus,
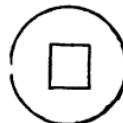
"Alfred endeavoured to civilise the people."

A is X—or the triangle is in the

circle; thus,

Combine these pairs of symbolical assertions, and it is
evident we may grant that the triangle and the
square are both in the circle, without being com-
pelled to admit that the triangle is in the square.
This apparent argument is an example of an Undis-
turbed Middle Term.
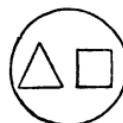
CHAPTER III.

OF THE FIGURES OF SYLLOGISMS.

THE *Figure* of a syllogism consists in the *place which the middle term occupies with respect to the Extremes of the Conclusion.* It is evident that all the possible positions in which the middle term can be placed must be four : it must be either the Subject of the major premise, and the Predicate of the minor; or the Predicate of both premises; or the Subject of both; or the Predicate of the major, and Subject of the minor. There are, therefore, only four Figures; and their excellence is to be judged of from the manner in which Aristotle's *dictum* can be applied to them.

The first Figure is that in which the Middle Term is made the Subject of the major premise, and the Predicate of the minor : thus,

>   A is B :
>   C is A ; therefore,
>   C is B.   Or,
>   Every virtue is profitable :
>   Prudence is a virtue ; therefore,
>   Prudence is profitable.

This is by far the most clear and natural of all the Figures, because to syllogisms in this Figure only does the *dictum,* above mentioned, at once apply.

In the second Figure the Middle Term is the Predicate of both premises : thus,

>   A is B :
>   C is not B ; therefore,
>   C is not A.   Or,
>   Every virtue is praiseworthy :
>   Injustice is not praiseworthy ; therefore,
>   Injustice is not a virtue.

In this Figure *negative* conclusions only can be proved ; because one of the premises must be negative, in order that the middle term, by being the predicate of a negative proposition, may be distributed.

In the third Figure the Middle Term is the Subject of both premises : thus,

> All A· is B :
> Some A is C ; therefore,
> Some C is B.　Or,

> All flowers are beautiful :
> Some flowers are roses ; therefore,
> Some roses are beautiful.

This is a correct syllogism, having the middle term the subject of each premise, because it conforms to the first *axiom,* although the *dictum* does not apply immediately to it, in its present form.　In this figure none but *particular* conclusions can be drawn.

The last, and the most awkward and unnatural of all the Figures, being the very reverse of the first, is that in which ·the *Middle Term is the Predicate of the major premise, and the Subject of the minor :* thus,

> Every A is B :
> Every B is C ; therefore,
> Some C is A.　Or,

> Every man is an animal :
> Every animal is sentient ; therefore,
> Something that is sentient is a man.　Or, again ;

> Every A is B :
> No B is C ; therefore,
> No C is A.　Or,

> Every liar is despised :
> No despised person is happy ; therefore,
> No happy person is a liar.

A syllogism stated thus, if according to rule, would certainly be valid.　It is, however, only a clumsy and inverted way of stating what would be properly and naturally expressed in the first Figure ; as may be done, in the above example, by transposing the premises, and simply converting the conclusion : thus,

> No despised person is happy :
> Every liar is despised ; therefore,
> No liar is happy.

CHAPTER IV.

OF THE MOODS OF SYLLOGISMS.

THE *Mood* of a syllogism is the legitimate determination of the three propositions, in the order in which they stand, according to their respective *quantity* and *quality;* that is, as each proposition is A, E, I, or O : for example—

  All wicked persons are miserable :
  All tyrants are wicked ; therefore,
  All tyrants are miserable.

 This syllogism is in the mood A, A, A, because each of the three propositions is a *universal affirmative.*

  All gold is precious :
  All gold is a mineral ; therefore,
  Some mineral is precious.

 This syllogism is in the mood A, A, I, because the major and the minor propositions are *universal affirmatives,* and the conclusion is a *particular affirmative.*

  He that is always in fear is not happy :
  Misers are always in fear ; therefore,
  Misers are not happy.

 This syllogism is in the mood E, A, E, because the major proposition and the conclusion are *universal negatives,* and the minor a *universal affirmative.* Thus, when we designate the three propositions of a syllogism, in their order, according to their respective quantity and quality, we are said to determine the Mood of that syllogism.

 As there are four kinds of propositions, A, E, I, O, and three propositions in each syllogism, all the possible ways of combining these four propositions by threes will be sixty-four. Each of the four may be a major premise ; each of these four majors may have four different minors ; and these sixteen pairs of premises may have each four different conclusions. The statement will therefore stand thus : $4 \times 4 (= 16) \times 4 = 64$. This is a mere arithmetical calculation of all the Moods pos-

sible, without any regard to logical rules; but many of these are inadmissible in practice, because they violate the rules formerly laid down for judging of a legitimate syllogism. The Mood E, E, E, must be rejected, because it has *negative premises;* I, O, O, is also inadmissible, because it has *particular premises;* and so many others, for the same and other faults, must be rejected. Upon examination it has been ascertained that of the sixty-four possible Moods there are only eleven that can be used in a legitimate syllogism. Of these eleven the following enumeration may be useful: A, A, A; A, A, I; A E, E; A, E, O; A, I, I; A, O, O; E, A, E; E, A, O; E, I, O; I, A, I; O, A, O.

All these Moods are not allowable in each of the four Figures mentioned above; as they may violate some of the foregoing rules in one Figure, though not in another. For example, I, A, I, is an allowable Mood in the third Figure; thus,

> I, Some afflictions are salutary:
> A, All afflictions are unpleasant; therefore,
> I, Some things that are unpleasant are salutary.

But this Mood in the first Figure would be inadmissible; thus,

> I, Some herbs are fit for food:
> A, Nightshade is an herb; therefore,
> I, Some nightshade is fit for food.

In this instance we have an *undistributed middle,* and therefore the syllogism is not valid.

In the second Figure A, E, E, is valid; thus,

> A, Every virtue is praiseworthy:
> E, Injustice is not praiseworthy; therefore,
> E, Injustice is not a virtue.

But in the first Figure this Mood would have an *illicit process of the major;* thus,

> A, Every man is an animal:
> E, A horse is not a man; therefore,
> E, A horse is not an animal.

In the first Figure the Mood A, A, A, is a valid argument; thus,

A, All human beings are entitled to liberty :
A, All slaves are human beings ; therefore,
A, All slaves are entitled to liberty.

But in the third Figure this Mood would have an *illicit process of the minor ;* thus,

A, All tyrants are cruel :
A, All tyrants are men ; therefore,
A, All men are cruel.

By applying the Moods to each Figure, it will be found that each Figure will admit of only six Moods which do not violate the rules against *undistributed middle,* and *illicit process.* Of these twenty-four valid Moods some are useless, because they have only a *particular* conclusion when a *universal* might have been drawn. For example, A, A, I, in the first Figure, is for this reason useless ; thus,

A, All human beings are entitled to liberty :
A, All slaves are human beings ; therefore,
I, *Some* slaves are entitled to liberty.

Five of the twenty-four Moods are, for this reason, considered unworthy of particular notice. Some of the Moods, however, conclude in one figure, when they do not in another; in this way, the number of legitimate conclusive Moods is increased to *nineteen ;* and to distinguish these Moods, and the Figures in which they are found, names have been devised, and embodied in the following mnemonic lines, which ought to be committed to memory :—

Fig. 1. Barbara, Celarent, Darii, Ferio : dato primæ.
Fig. 2. Cesare, Camestres, Festino, Baroco : secundæ.
Fig. 3. { Tertiæ, Darapti, Felapton, vult Datisi,-que
Cum Ferison, Disamis, Bocardo : sed dato
quartæ.
Fig. 4. Hæc, Bamarip, Cameres, Dimaris, Feslapo, Fresison.

In these words the *three vowels* denote the *Propositions* of which the syllogisms are composed, and indicate their *quantity.* The *consonants,* besides other uses, serve to keep in mind the *Figure* of the syllogism. The vowels which occur in the *first* syllable of each of these names shew the quantity and quality of the *major* proposition; the vowels of the *second* syllable shew the quantity and quality of the *minor;* and the vowels of the *third* syllable shew the quantity and quality of the *conclusion.* Thus, if it be said that any syllogism is *Celarent,* this shews that it is a Mood of the first Figure; that its *major* proposition is E, a universal negative; its *minor,* A, a universal affirmative; and its *conclusion,* E, a universal nega-tive. By studying these lines carefully, and trying several syllogisms, in different Moods, various particulars respecting these Figures will be ascertained; and the reasons for them will be found in the preceding rules. The following may thus be deduced :—

1. In the first Figure the major premise must be universal, and the minor affirmative. It is also the peculiar excellence of this figure that A, E, I, O, that is, all kinds of conclusions, can be proved by it; and A, that is, all universal affirmatives, can be proved only by this Figure.

2. In the second Figure the major premise must be universal, and one of the premises must be a negative. Hence the second Figure can only prove *negative* conclusions; because the middle term being the predicate in both premises, it would not be distributed unless one premise were negative; and if one pre-mise be negative the conclusion must be negative also.

3. In the third Figure the minor must be affirmative, and hence the conclusion must always be particular; because, as the middle term is the subject of both premises, there would be an *illicit process of the minor* if a universal conclusion were drawn; since no affirmative proposition distributes the pre-dicate.

4. In the fourth Figure the major term is predicated of the minor, and the minor is predicated of the middle, and the middle is predicated of the major; so that the major appears to be merely predicated of itself. It is, therefore, an inverted and awkward way of stating an argument, which is seldom or never used.

One Mood in each Figure may be given as an example, and the student can exercise himself by forming examples of the rest.

First, *Barbara;* (Bar) " all A is B : (ba) all C is A ; therefore, (ra) all C is B." Thus, let the major term, represented by B, be " miserable ;" the minor term C, be "tyrants ; and the middle term A, be " wicked men ;" you will then have the following syllogism in *Barbara* of the first Figure ; thus,

> Bar- All wicked men are miserable ;
> ba- All tyrants are wicked men ; therefore,
> ra. All tyrants are miserable.

Second, *Cesare ;* (Ce) "No A is B : (sa) every C is B ; therefore, (re) no C is A." Let the major term A, be "tyrant;" and the minor term C, be " benevolent person ;" and the middle term B, be " happy ;" you will then have the following syllogism in *Cesare* of the second Figure : thus,

> Ce- No tyrant is happy :
> sa- Every benevolent man is happy ; therefore,
> re. No benevolent man is a tyrant.

Third, *Darapti ;* (Da) "All A is B : (rap) all A is C ; therefore, (ti) some C is B." Let the major term B, be " painful ;" the minor term C, " profitable ;" and the middle term A, " afflictions ;" you will then have the following syllogism in *Darapti* of the third Figure ; thus,

> Da- All afflictions are painful :
> rap- All afflictions are profitable ; therefore,
> ti. Some things that are profitable are painful.

Fourth, *Bamarip ;* (Ba) "All A is B : (mar) all B is C ; therefore, (ip) some C is A." Let the major term A, be " tyrants ;" the minor term C, "unhappy ;" and the middle term B, " proud ;" you will then have the following syllogism in *Bamarip* of the fourth Figure ; thus,

> Ba- All tyrants are proud :
> mar- All proud persons are unhappy ; therefore,
> ip. Some persons that are unhappy are tyrants.

CHAPTER V.

OF THE REDUCTION OF SYLLOGISMS.

THE four Moods in the first Figure, as they are the clearest and most natural, are called *perfect.* The Moods of the other Figures are called *imperfect,* because Aristotle's *dictum* cannot be immediately applied to them. But, as it is on this *dictum* that all Reasoning ultimately depends, all the Moods of the other three Figures can be brought, in some way or other, into one of the four Moods of the first Figure. When a syllogism is thus operated upon, it is said to be *reduced* from an imperfect to a perfect Mood. This has given rise to the Reduction of Syllogisms; and any argument that cannot be so reduced as to be stated legitimately according to one of the four Moods of the first Figure is not valid.

In the Reduction of Syllogisms we are not allowed, of course, to *change* the terms, or introduce any *new* proposition. The premises being laid down, and their truth granted, all that is permitted is, that we so convert, or transpose, or otherwise operate on these premises, that they may become subject to the laws of the first Figure. This may be done in two ways, either by *Ostensive Reduction,* or by *Reductio ad impossibile.*

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SECTION I.

Of Ostensive Reduction.

By Ostensive Reduction we prove in the first Figure, from the premises of the imperfect syllogism originally given, either the very same conclusion, or one that implies it, and from which it may be justly and easily deduced. The truth of any proposition implies the truth of its illative converse. We are, therefore, allowed to convert the major or the minor premise, by the methods of *Conversion* formerly explained; and, if necessary, to transpose the premises after they have thus been converted; in this way the imperfect Mood may be reduced to

one of the four perfect Moods of the first Figure. Take the following as examples :—

> Every virtue is praiseworthy :
> Injustice is not praiseworthy ; therefore,
> Injustice is not a virtue.

This is a syllogism in *Camestres* of the second Figure, and it may be reduced to *Clarent* of the first, by *simply* converting the minor, and then transposing the premises ; thus,

> That which is praiseworthy is not injustice :
> Every virtue is praiseworthy ; therefore,
> No injustice is a virtue.

Again :

> All tyrants are cruel :
> All tyrants are men ; therefore,
> Some men are cruel.

This is a syllogism in *Darapti* of the third Figure ; but it may be reduced to *Darii* of the first, by converting the minor premise *per accidens ;* thus,

> All tyrants are cruel :
> Some men are tyrants ; therefore,
> Some men are cruel.

Again :

> Some slaves are not discontented :
> All slaves are wronged ; therefore,
> Some who are wronged are not discontented.

This is a syllogism in *Disamis* of the third Figure, and it may be reduced to *Darii* of the first, by converting the major by *contraposition,* and then transposing the premises ; thus,

> All slaves are wronged :
> Some who are not discontented are slaves ; therefore,
> Some who are not discontented are wronged.

In this case the conclusion is the converse by *negation* of the original conclusion, and therefore may be inferred from it. By these different methods all the imperfect Moods may be reduced to the four perfect Moods of the first Figure ; and

this is called *Ostensive Reduction,* because either the same con-
clusion is proved, or one which implies it, and from which it
may be justly inferred.

––––––––

By *Reductio ad impossibile* we prove, in the first Figure, not
directly that the conclusion of the imperfect syllogism is *true,*
but that it *cannot be false;* or, in other words, that an ab-
surdity would follow on the supposition of its being false. The
following will furnish an example :—

> All truly wise men live virtuously :
> Some philosophers do not live virtuously ; therefore,
> Some philosophers are not truly wise men.

If this conclusion be not true, its *contradictory* must be
true ; viz.—

> All philosophers are truly wise men.

Make this proposition, then, the minor premise of the above
syllogism, and a false conclusion will be proved ; thus,

> All truly wise men live virtuously :
> All philosophers are truly wise men ; therefore,
> All philosophers live virtuously.

This conclusion is the *contradictory* of the original minor
premise ; it must therefore be false, because the *premises* are
always supposed to be granted. If this conclusion is false,
then one of the premises from which it has been correctly de-
duced must be false also ; but the *major premise,* being one
of those originally granted, must be true ; the falsity must,
therefore, be in the *minor premise.* But the minor premise is
the contradictory of the original conclusion ; hence the original
conclusion must be true.

This kind of reduction is a very indirect and obscure mode
of reasoning, and is seldom employed except for *Baroco* and

Bocardo. These two moods, however, can be reduced *ostensively* by *contraposition.*

The mnemonic lines formerly quoted are of great service in the Reduction of Syllogisms. The names given to the various Moods in the several Figures, although they may seem harsh and unmeaning, have been framed so as to point out the manner in which each of the imperfect Moods is to be reduced. The initial letters of all the Moods are B, C, D, F. The first letter in every imperfect Mood indicates that it is to be reduced to that Mood of the first Figure which begins with the same letter. If its initial letter be B, it must be reduced to *Barbara ;* if it be C, to *Celarent ;* if D, to *Darii ;* and if F, to *Ferio.* This rule has been expressed by the Logicians ; thus,

> Barbara demonstrat, B ; Celarent, C, reducit :
> D, redit ad Darii ; F, redit ad Ferio.

Besides the initial letters, there are other consonants, found in the middle or end of these names which designate the different Moods, which are also made use of to indicate the *kind* of reduction that is to be employed. These letters are *s*, *p*, *m*, and *c*, and their meaning is as follows : *s*, shews that the proposition denoted by the vowel immediately preceding it, is to be *converted simply ; p*, that the proposition denoted by the vowel immediately preceding it, is to be *converted per accidens ;* and *m*, shews that the premises are to be *transposed.* Thus, in *Bamarip*, the B shews that it must be reduced to *Barbara ;* the *m*, that the premises must be transposed ; and the *p*, that the conclusion must be converted *per accidens.* So in *Camestres*, the C indicates that it must be reduced to *Celarent ;* the *m*, shews that the premises must be transposed ; and the two *ss*, shew that the minor premise and the conclusion must be converted simply. The other consonant *c*, points out the *reductio ad impossibile.* Wherever it occurs it shews that the proposition denoted by the vowel immediately before it must be left out, and the contradictory of the conclusion substituted in its place ; consequently in *Baroco* the contradictory of the *conclusion* is to be substituted for the *minor premise ;* and in *Bocardo* it is to be substituted for the *major.* These rules have been expressed thus,

S, vult simpliciter verti ; P, vero per accid.
M, vult transponi ; C, per impossibile duci.

CHAPTER VI.

OF HYPOTHETICAL SYLLOGISMS.

WE have hitherto been considering *pure* Categorical Syllogisms. It is often necessary, however, to introduce into reasoning various kinds of *Conditional Propositions;* and as the force of the argument sometimes turns on these *hypothetical premises,* it is necessary that we notice this class of syllogisms, and explain the rules whereby their validity may be ascertained.

A Hypothetical Proposition consists of two or more Categorical propositions, connected by a conjunction so as to make them *one* proposition. They are denominated, after their respective conjunctions, either *Conditional* or *Disjunctive*. Thus : " if A is B, then C is D," is a Conditional proposition ; " either A is B, or C is D," is a Disjunctive proposition.

Sometimes a hypothetical conclusion is inferred from a hypothetical premise, while the reasoning process remains, properly speaking, purely categorical. In this case the force of the reasoning does not turn on the hypothesis ; the *condition* expressed is considered as attached *to one of the terms;* and the reasoning proceeds, and is to be judged of, in the same way as if it were a categorical syllogism. For example :—

Every conqueror is *either a hero or a villain :*
Cæsar was a conqueror ; therefore,

Cæsar was *either a hero or a villain.*

In this case if " *either a hero or a villain* " be considered as merely the predicate of the major premise, and the predicate of the conclusion, the syllogism may be considered merely *categorical.*

But when the reasoning *rests* on the hypothesis, and a hypo-

thetical conclusion is drawn from a hypothetical premise, then the syllogism is *Hypothetical ;* and rules have been devised for ascertaining the validity of such arguments, without bringing them into the categorical form.   Of Hypothetical Syllogisms there are two kinds, the *Conditional* and the *Disjunctive.*

SECTION I.

Of Conditional Syllogisms.

When in any Syllogism the *major premise* is a conditional proposition, the syllogism is called *conditional;* thus,

> If there is a God, He ought to be worshipped :
> But there is a God ; therefore,
> He ought to be worshipped.

In this example the major premise is *conditional ;* the syllogism is, therefore, called by that name.   If only the *major* proposition be conditional, as in the above example, the conclusion will be categorical ; but if the *minor* be conditional, the conclusion will also be conditional ; thus,

> All tyrants deserve death :
> If the Emperor oppresses the people he is a tyrant ;
>   therefore,
> If the Emperor oppresses the people, he deserves death.

This kind of argument, however, should be avoided as much as possible, as it is an awkward mode of reasoning ; but syllogisms whose *major* only is hypothetical may be used with great propriety and advantage.   In explaining this kind of syllogism, it is to be observed, that all *conditional propositions* are made up of two distinct parts, and only two, which are in fact two *categorical propositions.*   Of these the one results from the other, and expresses the condition on which the predicate agrees or disagrees with the subject ; and the other joins or disjoins the predicate and the subject.   The proposition from which the other results, or which expresses the con-

dition, is called the *Antecedent ;* that which results from it is called the *Consequent ;* and the connexion between the two, expressed by the word " *if*," is called the *Consequence.*

The natural order for such a proposition is, that the antecedent should come *before* the consequent; but this is not material, as we often find it reversed ; thus,

(Consequence)   (Antecedent)   (Consequent)

If——there is a God—He ought to be worshipped : qr :

    (Consequent)   (Consequence)   (Antecedent)

The poor are happy——if——they are contented.

In all propositions of this kind, if they are correct in point of form, the relation between the antecedent and consequent must ever be true and real ; that is, the truth of the antecedent must necessarily imply the truth of the consequent ; for otherwise the proposition will be false, and ought not to be admitted into argumentation. The antecedent and the consequent may be both false, or they may be both true, in themselves considered ; but it must in every case be *true* that the consequent *follows* from the antecedent ; hence the truth or falsity of a conditional proposition depends entirely on the *consequence.* This will appear from the following examples :—

> If Christianity is of divine origin, it ought to be
>   embraced :

In this case both the antecedent and the consequent are *true* in themselves ; and the whole proposition is *true* likewise, because there is a real connexion between the antecedent and the consequent.

> If Christianity is an imposture, it ought to be
>   abandoned :

In this instance both antecedent and consequent are *false,* considered separately and in themselves ; but the *whole* proposition is *true,* because the consequent *follows* from the antecedent ; that is, they are so connected that if you admit the one, you must admit the other also.

It is particularly to be remembered, however, that the truth or falsity of a conditional proposition does not at all depend on the truth or falsity of the two categorical propositions of which it is composed. In the last instance the antecedent

and the consequent are both *false ;* yet the whole proposition is *true.* But the reverse of this may take place ; that is, the antecedent and the consequent may be both *true* in themselves, and yet the *whole* proposition be *false ;* thus,

> If Christianity is from God, it is but partially known.

Here it is *true* that " Christianity is from God," and it is *true* also that " it is but partially known ;" yet it is *not true* that the latter of these propositions results from the former, or depends upon it. The *whole* proposition, therefore, is *false,* because there is no necessary connexion between the antecedent and the consequent. No conditional proposition, then, must be admitted into argumentation which does not contain some certain and genuine condition ; that is, in which the antecedent necessarily implies the consequent.

It follows, then, that when any conditional proposition is assumed in reasoning, if we admit the antecedent, we must at the same time necessarily admit the consequent ; and if we reject the consequent, we are bound in like manner to reject the antecedent ; for, as the antecedent always expresses some condition which necessarily implies the truth of the consequent, by admitting the antecedent we admit this condition, and therefore are bound to admit the consequent likewise. In like manner, if it appears that the consequent ought to be rejected, the antecedent ought evidently to be rejected also ; because, as we have just shewn, the admitting of the antecedent would necessarily imply the admission of the consequent. There are, therefore, two rules, applying to Conditional Propositions, which must be kept particularly in mind, because Conditional Syllogisms are founded on these rules. They are,

First ; *If the Antecedent is granted, the Consequent may be inferred ;* and,

Secondly ; *If the Consequent be denied, the Antecedent may be denied.*

In accordance with these rules there are two methods of arguing in conditional syllogisms, which lead to a certain and unavoidable conclusion. The first, founded on the first rule, takes place when the *minor premise admits the antecedent ;* then we are said to argue from the admission of the antecedent, to the admission of the consequent. This is called a *Construc-*

tive Conditional Syllogism, because the whole of the conditional proposition is thus established. Thus,

> If there is a God, he ought to be worshipped :
> But there is a God ; therefore,
> He ought to be worshipped.

In this case *the antecedent is admitted in the minor premise ;* it is evident, therefore, from the first rule, that the conclusion must admit the consequent ; and thus the *whole* conditional proposition, both antecedent and consequent, is established. If A is B, C is D : but A is B ; therefore, C is D.

The other method of arguing legitimately in conditional syllogisms is founded on the second rule, and it takes place when *the minor premise rejects the consequent ;* and we are then said to argue from the removal of the consequent, to the removal of the antecedent. This is called a *Destructive* Conditional Syllogism, because the whole of the conditional proposition is thus rejected or destroyed. Thus,—

> If the season has been good, corn must be cheap :
> But corn is not cheap ; therefore,
> The season has not been good.

In this case *the consequent is contradicted in the minor premise,* and the antecedent is contradicted in the conclusion ; thus the *whole* of the conditional proposition is removed. If A is B, C is D : but C is not D ; therefore, A is not B.

These two methods of arguing include all the classes of conditional syllogisms from which a legitimate conclusion can be drawn. It is to be observed, however, that in syllogisms of this kind, the rules given above respecting *conditional propositions* must be strictly observed, otherwise nothing can be legitimately proved. If, for instance, in the last case, the minor premise were to deny the *antecedent,* instead of denying the *consequent,* which is called arguing from the removal of the antecedent to the removal of the consequent, no legitimate inference could be drawn : because, although the antecedent always expresses some real condition which, when once admitted, necessarily implies the consequent, yet it does not follow that there is no *other* condition from which the same consequent may follow ; hence, after removing

the antecedent, the consequent may still follow from *some other antecedent*. Thus, were we to say, "if a stone is exposed to the rays of the sun, it will contract a certain degree of heat," we affirm a *true* proposition, and admitting the antecedent, we must also admit the consequent. But, as there are other ways in which a stone may contract heat, it will not follow from the *denial* of this antecedent, that, therefore, the consequent cannot take place. If, therefore, we deny the antecedent, and argue from it, the reasoning will be false. Thus,

> If a stone is exposed to the rays of the sun, it will contract a certain degree of heat :
> But it has not been exposed to the rays of the sun ; therefore,
> It has not contracted a certain degree of heat.

This reasoning is evidently false, because there are many other ways in which a stone may contract heat besides from exposure to the rays of the sun. This mode of reasoning is, therefore, inadmissible in conditional syllogisms.

Again ; if the minor premise admits the *consequent*, instead of admitting the *antecedent*, in this case also the conclusion will not be legitimate, because the same consequent may follow from some other antecedent. The admitting of any consequent does not prove in what way this result has happened, but only that some one of the antecedents that could lead to this result must have existed. Take the proposition above as an example ; "if a stone is exposed to the rays of the sun, it will contract a certain degree of heat ;" admitting the consequent, *that it has contracted a certain degree of heat,* we are not bound to admit the antecedent, *that it has, therefore, been exposed to the rays of the sun ;* because there are many other ways in which this heat may have been contracted. This is called arguing from the admission of the consequent to the admission of the antecedent, and is evidently inadmissible.

The following rules must, therefore, be observed in conditional syllogisms :—

1. *If the minor affirms the antecedent, or denies the consequent, the conclusion will be valid.*

2. *If the minor affirms the consequent, or denies the antecedent, nothing can be inferred.*

SECTION II.

Of Disjunctive Syllogisms.

As when the major premise is conditional, the syllogism is called conditional; so when the *major premise is disjunctive,* the syllogism to which it belongs is called a *Disjunctive Syllogism.* In a disjunctive proposition it is implied that at least some one of its members must be true; if, then, in the *minor* premise, all except one be denied, the truth of this remaining one may be inferred. For example, A is either B, or C, or D; but A is neither B nor C; therefore, A is D. Thus,

> The world is either self-existent,' or the work of some finite, or of some infinite Being:
> But it is neither self-existent, nor the work of a finite being; therefore,
> It is the work of an infinite Being.

A disjunctive proposition may consist of any number of categorical propositions; and of these some *one* at least must be true, or the whole proposition will be false. Each of these categorical propositions gives a predicate to the subject of the whole disjunctive proposition; and of these several predicates *one* is affirmed necessarily to belong to the subject, to the exclusion of all the rest. This predicate, however, is left undetermined in the *major premise;* in the *minor* we determine which it is; and then, in the *conclusion,* we prove *that* predicate belongs to the subject. As soon as we determine the predicate that necessarily belongs to the subject, all the rest are rejected, and the remaining one is affirmed to be true. When, therefore, in a disjunctive syllogism, the several predicates are enumerated in the *major,* if the *minor* establishes any one, or any number of these predicates, the *conclusion* ought to remove all the rest; or, if in the *minor* all the predicates *but one* are removed, the *conclusion* must necessarily establish that one. Thus, in the disjunctive syllogism given above, the *major* affirms one of these predicates to belong to the earth—either *self-existence,* or that it is *the work of some finite being,* or that it is the work of an *infinite Being.* Two of these predi-

cates are removed in the *minor premise,* viz., *self-existence,* and its being *the work of some finite being;* hence, in the *conclusion,* the other predicate is necessarily ascribed to it ; that is, it is affirmed to be *the work of an infinite Being.*   A is either B, or C, or D : but A is not B or C ; therefore, it is D.

> It is either spring, summer, or winter :
> But it is not spring or summer ; therefore,
> It is winter.

In the above example all the categorial propositions except *one* are denied ; and hence the conclusion is a categorical proposition.   But sometimes, after several of the categorical propositions are denied, there are more than one predicate remaining ; in this case, the conclusion will be a disjunctive proposition.   For example, A is either B, C, D, or E : but A is not B or C ; therefore, it is either D or E.   Thus,

> It is either spring, summer, autumn, or winter :
> But it is neither spring nor summer ; therefore,
> It is either autumn or winter.

In these examples it is implied that only one of the categorical propositions can be true ; hence, if the minor *affirms* that proposition, the rest must be *denied* in the conclusion. For example, in the above syllogism we may say, A is either B, C, D, or E : but A is B ; therefore, it is neither C, D, nor E.   Thus,

> It is either spring, summer, autumn, or winter :
> But it is spring ; therefore,
> It is neither summer, autumn, nor winter.

CHAPTER VII.

REDUCTION OF HYPOTHETICAL SYLLOGISMS.

THE rules laid down above are quite sufficient for trying the validity of all hypothetical arguments ; as, however, all reasoning may ultimately be brought to the test of Aristotle's *dictum,*

we must now shew how a Hypothetical Syllogism can be Reduced so that this test may be at once applied to it. This is called the *Reduction of Hypotheticals*.

If only the *major premise* be hypothetical, and the Antecedent and Consequent happen to have the same Subject, the reduction of a Hypothetical Syllogism is easily effected. In this case the *minor premise* and the *conclusion* are categorical; they can, therefore, easily be formed into a regular categorical syllogism by supplying a categorical *major*. Take, for example, the following hypothetical syllogism :—

> If Cæsar was a tyrant, he deserved death :
> But Cæsar was a tyrant ; therefore,
> He deserved death.

In this example the *major* premise is conditional; the antecedent and consequent have the same subject; and the *minor* premise and conclusion are categorical. To reduce the whole syllogism to a categorical form, a Categorical Major premise is wanted. Now, a Conditional proposition may be illatively *converted*, by taking the *Contradictory* of the Consequent for an Antecedent, and the *Contradictory* of the Antecedent for a Consequent. Thus, "if A is B, C is D," implies that "if C is not D, A is not B." "If Cæsar was a tyrant, he deserves death," evidently implies that, "if he did not deserve death, Cæsar was not a tyrant." This corresponds to the *conversion* of the Categorical Proposition A, by *Contraposition*. Hence, every Conditional proposition is, in fact, equivalent to a universal affirmative categorical proposition—the *Antecedent* answering to the *subject*, and the *Consequent* to the *predicate*. Assume, then, as a *major*, the equivalent proposition that " *all tyrants deserve death*," the syllogism is then reduced to a categorical syllogism in *Barbara ;* and the same conclusion is drawn as when the syllogism was in the hypothetical form. Thus,

> Bar-   All tyrants deserve death :
> ba-   But Cæsar was a tyrant ; therefore,
> ra.   He deserved death.

But it often happens, in a hypothetical syllogism, that the antecedent and consequent of the conditional proposition have

not the same *Subject.*   In this case the above method of re-
duction will not apply, because a Categorical premise cannot
be formed which will be equivalent to the original Conditional
proposition.   Another method has, therefore, been adopted,
which is, to consider every conditional proposition as a uni-
versal affirmative categorical proposition, *of which the Terms
are entire propositions,* the *antecedent* answering to the *subject,*
and the *consequent* to the *predicate.*

Take for example the following conditional syllogism :—

> If the season is good, corn is likely to be cheap :
> But the season is good ; therefore
> Corn is likely to be cheap.

In this instance, to say, " If the season is good, corn is
likely to be cheap," is equivalent to saying, " the supposition
of the season being good, is a supposition of corn being likely
to be cheap : " and the minor premise of this conditional
syllogism is equivalent to saying, " the present supposition is
the supposition of the season being good."   By adopting these
as the premises, a conclusion may be drawn in *Barbara,* ex-
actly equivalent to the original conclusion of the conditional
syllogism.   Thus,

> Bar- The supposition of the season being good, is a sup-
>   position of corn being likely to be cheap :
> ba-   The present supposition is the supposition of the
>   season being good ; therefore,
> ra.   The present supposition is the supposition of corn
>   being likely to be cheap.

The above is an example of a *Constructive* conditional syl-
logism reduced to a *Categorical* syllogism in *Barbara.*   In like
manner a *Destructive* conditional syllogism may be reduced to
a *Categorical ;* thus,

> If trade is good, wages will be high :
> But wages are not high ; therefore,
> Trade is not good.

This syllogism is equivalent to the following :—

> The supposition of trade being good, is the supposition
> of wages being high :

The present supposition is the supposition of wages not
being high ; therefore,

The present supposition is not the supposition of trade
being good.

In this form the syllogism is in *Camestres,* which can easily
be reduced to *Celarent,* by the method of reduction formerly
explained.

All hypothetical syllogisms may be reduced in the manner
above stated. The mode of expression, however, in those
cases where the antecedent and consequent have not the same
subject, is exceedingly awkward and circuitous. A more con-
venient form may sometimes be substituted, by taking "*true*"
for one of the terms. Thus,—

To say that wages are high, is not true :

To say that trade is good, is to say that wages are high ;
therefore,

To say that trade is good is not true.

In some cases, also, it may be better to unfold the argument
into two syllogisms. Take, for example, the following syllo-
gism :—

If Victoria is a good queen, Great Britain is likely to
prosper :

But Victoria is a good queen ; therefore,

Great Britain is likely to prosper.

This conditional syllogism may be reduced to *two* categori-
cal syllogisms. Thus,

Victoria is a good queen :

The ruler of Great Britain is Victoria ; therefore,

The ruler of Great Britain is a good queen.

Again :

Every country governed by a good queen is likely to
prosper :

Great Britain is governed by a good queen ; therefore,

Great Britain is likely to prosper.

These categorical syllogisms are in *Barbara,* and from them

the very same conclusion is drawn that we have in the above conditional syllogism.

It is to be observed, however, that, in ordinary practice, it is not necessary to reduce Hypotheticals to Categoricals, in any of the ways mentioned above, in order to ascertain their validity. Their own rules are sufficient for this purpose, without our subjecting the argument *directly* to the test of Aristotle's *dictum*. The above rules shew, however, that they *can* be so reduced if required; and that they, as well as Categorical syllogisms, depend on that one simple principle on which all Reasoning rests.

CHAPTER VIII.

OF IRREGULAR SYLLOGISMS.

THUS far we have been considering Syllogisms, which, not being defective or expressed in an abridged form, are denominated *regular*. In these arguments the parts are complete; that is, the three propositions of which the Syllogisms consist are expressed in due form. There are, however, various forms of Argument which, as generally used, are imperfect, but which can easily be expanded into regular syllogisms. These have been called *Irregular Syllogisms;* the following are the most important :—

1. *The Enthymeme.* This is a Syllogism which seems to consist of only *two* propositions; but the other is only suppressed. Thus,

> Cæsar was a tyrant ; therefore,
> Cæsar deserved death.

In this instance, there are only two propositions expressed, and the syllogism appears to be imperfect; but it may be easily formed into a regular syllogism by merely supplying the premise that is wanting. If, in the above instance, the *major premise* is supplied, the syllogism will then be seen to be perfect. Thus,

> Every tyrant deserves death :
> Cæsar was a tyrant ; therefore,
> Cæsar deserved death.

Again :

> Every man is mortal ; therefore,
> Every king is mortal.

In this case the *minor premise* is omitted ; let it be supplied, and the syllogism is regular : thus

> Every man is mortal :
> Every king is a man ; therefore,
> Every king is mortal.

This form of reasoning is called *Enthymeme*, a name derived from the Greek, and denoting that one of the premises is left out, but retained in the mind. It is, however, merely a syllogism mutilated in form. It is the ordinary mode of speaking and writing, not only on rhetorical subjects, but generally, even when engaged in close argumentation. It never was intended that, on all occasions, reasoning should be carried on in a series of syllogisms regularly expressed. It often happens that some one of the premises on which our reasoning turns is either a self-evident truth, or one that is familiar to us, and acknowledged by our opponent. In this case, unless for some particular purpose, it would be mere waste of time to state the syllogism at full length, and draw the conclusion in due form. The Enthymeme, or this abbreviated method of reasoning, is, therefore, adopted, which shortens discourse, gives vigour and life to our statements, and, by leaving something to be inferred by the mind itself, both pleases and excites attention.

However long the reasoning process may be that is carried on in this manner, and however concisely the train of argument may be expressed, it may easily be reduced to a series of regular syllogisms ; and where the conclusiveness of the argument is not evident, it is only by this method that the validity of the reasoning can be ascertained. There is no difficulty, however, in filling up the Enthymeme, by supplying either the major or the minor premise, so as to make it a perfect syllogism. All the *terms* which are necessary to form the *major*

or the *minor* premise that may be wanting to complete the syllogism, will be found in the *premise* and the *conclusion* of which the Enthymeme consists. And the following rules will direct us in what cases we should supply the one, and in what cases the other :—

First : If the term *twice repeated* be found in the *subject* of the conclusion, the *major premise* must be supplied. Thus, in the first example given above, the term *twice repeated* is " Cæsar ; " and this term is the *subject* of the conclusion ; the *major premise* must, therefore, in that case, be supplied. Thus,

> Every tyrant deserves death :
> Cæsar was a tyrant ; therefore,
> Cæsar deserved death.

Again :

> Man is a reasonable being; therefore,
> Man is accountable.

Here the term *twice repeated* is " Man," and it is the *subject* of the conclusion ; hence the *major premise* must be supplied. Thus,

> Every reasonable being is accountable :
> Man is a reasonable being ; therefore,
> Man is accountable.

Second : If the term *twice repeated* be found in the *predicate* of the conclusion, the *minor premise* must be supplied. Thus, in the second example given above, the term *twice repeated* is " mortal," and this term is the *predicate* of the conclusion ; the *minor premise* must, therefore, be supplied. Thus,

> Every man is mortal :
> Every king is a man ; therefore,
> Every king is mortal.

Again :

> A free people must be happy ; therefore,
> The English must be happy.

Here the term *twice repeated* is " happy," which is the *pre-*

dicate of the conclusion ; in this case, then, the *minor premise* must be supplied. Thus,

> A free people must be happy :
> The English are a free people ; therefore,
> The English must be happy.

In all these cases the reasoning is purely syllogistic, and must be judged of by the rules formerly laid down.

2. *The Sorites.* This is an abridged form of stating a train of arguments, and is called *Sorites*, from a Greek word signifying a heap, or pile. This mode of reasoning consists of several propositions so arranged that the predicate of the first becomes the subject of the second, and so on, in a regular progression, till at length, in the ultimate conclusion, the last predicate is affirmed of the first subject. In this way we have a string of syllogisms, in the first figure, in which the conclusion of each is made the premise of the next, till we arrive at the last conclusion. A is B, B is C, C is D, D is E, E is F, F is G ; therefore, A is G. Thus,

> The soul is a thinking substance ;
> A thinking substance is spirit ;
> Spirit has no extension ;
> What has no extension has no parts ;
> What has no parts is indissoluble ;
> What is indissoluble is immortal ; therefore,
> The soul is immortal.

This combination of propositions may be continued to any length without weakening the ground on which the conclusion rests ; because the Sorites has as many *middle terms* as there are intermediate propositions between the first and the last; and consequently, may be drawn out into as many separate syllogisms as there are middle terms. It is, therefore, nothing but a series of syllogisms, of the first figure, expressed in this abridged manner, in order that we may proceed with greater rapidity in our reasoning process. If we wish to ascertain the validity of this argument, we can easily do so by resolving the series into the distinct syllogisms of which it is composed.

If the above example be drawn out into the separate syllogisms of which it consists, it will be found that the first syllogism in the series has for its *major premise* the *second* proposition of the Sorites, and for its *minor premise* it has the *first* proposition. Thus,

> A thinking substance is spirit :
> The soul is a thinking substance ; therefore,
> The soul is spirit.

The conclusion of the first syllogism must now become the *minor premise* of the second syllogism. Thus,

> Spirit has no extension :
> The soul is spirit ; therefore,
> The soul has no extension.

This conclusion must now be made the *minor premise* of the next syllogism ; and so on, to the end of the series. The *first* proposition in a Sorites is, therefore, the only *minor premise* that is expressed ; because each successive conclusion becomes the minor premise of the succeeding syllogism. Hence in a Sorites only the *first* proposition and the *conclusion* can be *particular ;* because in the first figure the *minor proposition* may be particular, but not the *major ;* and all the propositions after the first, till the conclusion of the Sorites, are major premises. It is evident also that in a Sorites there may be *one,* and only one, negative premise, namely, the last in the series ; for if any of the others were negative, the result would be, that one of the syllogisms of the Sorites would have a *negative minor premise,* which in the first figure is inadmissible, since in that figure the minor must always be affirmative.

It is evident, too, that a Sorites may be formed of Conditional, in the same way as it is with Categorical, propositions. Any number of Conditional propositions may be so joined together in a series, that the Consequent of the first shall become successively the Antecedent of the next ; in which case, by establishing the Antecedent of the first proposition, we establish the Consequent of the last ; or by removing the last Consequent, we remove also the first Antecedent. The following is an example of a *Constructive* conditional Sorites : if

A is B, C is D ; if C is D, E is F ; if E is F, G is H ; but A
is B ; therefore, G is H. Thus,

> If the Scriptures are the Word of God, it is important
>   that they should be well explained;
> If it be important that they should be well explained,
>   they deserve to be diligently studied ;
> If they deserve to be diligently studied, an order of men
>   should be set apart for that purpose ;
> But the Scriptures are the Word of God ; therefore, an
>   order of men should be set apart for diligently study-
>   ing them.

In the same way a *Destructive* conditional Sorites may be
formed ; but in this case we must go back from the denial of
the last Consequent to the denial of the first Antecedent.
For example, if A is B, C is D ; if C is D, E is F ; if E is F,
G is H ; but G is not H ; therefore, A is not B. Thus,

> If the soul is material, it must have extension ;
> If it has extension, it must have parts ;
> If it has parts, it must be dissoluble ;
> But the soul is not dissoluble ; therefore,
> It is not material.

The validity of this kind of argument may be ascertained by
resolving it into its distinct syllogisms, and trying them by
the rules formerly laid down.

3. *The Dilemma.* This is a complex Conditional Syllogism,
called, from the Greek, *Dilemma*, because of the *two* principal
members of which such an argument consists. It is generally
employed to prove the absurdity or falsity of some assertion.
In order to this we assume a conditional proposition, the *Ante-
cedent* of which is the assertion to be disproved, and the *Conse-
quent* is a disjunctive proposition, enumerating all the possible
suppositions on which that assertion can take place. If, then,
it appears that all these several suppositions ought to be re-
jected, it is plain that the Antecedent, or the assertion itself,
must be rejected likewise. When, therefore, a proposition of
this kind is made the *major* of a syllogism, if the *minor* rejects
all the suppositions contained in the Consequent, it follows

necessarily that the *conclusion* ought to reject the Antecedent, which is the matter to be disproved. Thus, if I wished to shew the absurdity of denying that two persons, James and John, were of the same age, I assume, in the first place, that if their ages are *not* equal, the one must be either greater or less than the other; I then shew, for such and such reasons, that it cannot be *greater;* and, for such and such reasons, that it cannot be *less:* and, having thus destroyed the possibility of their being unequal, I prove that they are the same.

The Dilemma is used when you have, as admitted truths, two or more Conditional propositions, with different Antecedents, but each with the same Consequent; and these Antecedents are such that you cannot be sure of the truth of any one of them separately, but are sure that one or other of them must be true. You first state both of the Conditional propositions; then you assert disjunctively the Antecedents; and then you infer the common Consequent. " This kind of argument was urged by the opponents of Don Carlos, the pretender to the Spanish throne; which he claimed as heir-male, against his niece the queen, by virtue of the Salic-law excluding females; which was established (contrary to the ancient Spanish usage) by a former king of Spain, and was repealed by King Ferdinand. They say, 'If a king of Spain has a right to alter the law of succession, Carlos has no claim; and if no king of Spain has that right, Carlos has no claim; but a king of Spain either has or has not such right; therefore, (on either supposition,) Carlos has no right.' " *

The Dilemma, like Simple Conditional Syllogisms, sometimes takes the *Constructive* form. When we have a *major premise* having several *Antecedents*, all with the same *Consequent*, and these Antecedents are disjunctively granted in the *minor premise;* that is, it being granted that some *one* of them is true, then the Consequent common to all these Antecedents may be inferred, as in the case of a Simple Constructive Syllogism. For example, if A is B, C is D: and if X is Y, C is D: but either A is B, or X is Y; therefore, C is D. Thus,

> If the guilty are detected, their punishment makes them miserable:

> If they are not detected, their own consciences make
>   them miserable :
> But they must either be detected or not :
> Therefore the guilty are miserable.

If the several Antecedents have each a *different Consequent*, then, if they are disjunctively granted, the Consequents can only be disjunctively inferred. For example, if A is B, C is D: and if X is Y, E is F: but either A is B, or X is Y; therefore, either C is D, or E is F. Thus,

> If this spendthrift is rich, he is prodigal :
> If he is poor, he is unjust :
> But he is either rich or poor ; therefore,
> He is either prodigal or unjust.

In these two cases the Syllogisms are evidently Constructive.

The Dilemma sometimes takes the *Destructive* form. When there are several Antecedents each with a different Consequent, if, in the minor premise, you disjunctively deny the Consequents, you may in the conclusion disjunctively deny the Antecedents. For example, if A is B, C is D : and if X is Y, E is F : but C is not D, and E is not F ; therefore, A is not B, and X is not Y. Thus,

> If this man were prudent, he would behave well for his
>   own sake :
> If he were benevolent, he would behave well for the good
>   of others :
> But he does not behave well, either for his own sake, or
>   for the good of others ; therefore,
> He is neither prudent nor benevolent.

These arguments are generally called Dilemmas, but they differ very little from Conditional Syllogisms ; and, in these examples, we have stated the arguments at length, and arranged the parts of which they consist in separate lines, in order that it may be at once seen how easily they can be reduced to this more simple form. Take, for example, the above Destructive Dilemma ; it may be reduced to two Destructive Conditional Syllogisms. Thus, if A is B, C is D : but C is not D ; therefore, A is not B.

> If this man were prudent, he would behave well for his
>   own sake :
> But he does not behave well for his own sake ; therefore,
> He is not prudent.

Again : if X is Y, E is F : but E is not F ; therefore, X is not Y.

> If this man were benevolent, he would behave well for
>   the good of others :
> But he does not behave well for the good of others ;
>   therefore,
> He is not benevolent.

A Constructive Dilemma may also be reduced the same way to two or more Constructive Conditional Syllogisms. Thus, in the example given above, we may say, if A is B, C is D : but C is D ; therefore, A is B. Thus,

> If this spendthrift is rich, he is prodigal :
> But he is rich ; therefore,
> He is prodigal.

Again : if X is Y, E is F : but E is F ; therefore, X is Y. Thus,

> If this spendthrift is poor, he is unjust :
> But he is poor ; therefore,
> He is unjust.

Now, in all correct Dilemmas, an opponent may deny *either* of the minor premises, but he cannot deny *both;* hence he must admit one or other of the conclusions ; because, when a Constructive Dilemma is employed, it is supposed that *some one* of the Antecedents must be true ; and when a Destructive Dilemma is used, that *some one* of the Consequents must be false. As they cannot, therefore, be both admitted or both rejected, the opponent is left to choose which he likes, and in either case he is confuted. He is thus caught on the horns of a Dilemma whichever way he turns. This kind of argument can be applied to all subjects, and is often used in Mathematical demonstrations. Nothing is more common with *Euclid,* when about to shew the equality of two given figures, or, which is the same thing, to prove the absurdity of asserting them to

be unequal, than to adopt this mode of argument, *that if they are not equal, the one must either be greater or less than the other ;* and then, having destroyed both these suppositions, on which alone their inequality can rest, he proves that they *are* equal to each other.   By reducing the Dilemma to the several Syllogisms of which it consists, and by applying to them the rules laid down for ascertaining their validity, we shall be taught how to use, and how to judge of, these arguments.

4. *The Epichirema.*   This is a Syllogism which has, to one or both of the premises, the proof immediately subjoined.   It is often desirable that each proposition in an argument should be clearly established before we advance to the next step in the reasoning, in order that we may carry conviction with us as we move on to the conclusion.   This is often necessary in didactic and argumentative compositions, in public addresses, and in common conversation ; in these cases, we subjoin the proof of the premises as we announce them, and then, afterwards, draw the conclusion.   Sometimes it may be deemed necessary to subjoin the proof to both premises ; in other cases, it may be unnecessary to prove more than one of them, the other being self-evident, or admitted ; but in either case, the syllogism is called, from the Greek, an Epichirema, because the proof is thus furnished ready to the hand.   Thus,

> Everything is a blessing to men that leads them to prepare for eternity ; because, in so doing, they act wisely —secure their present peace—and promote their best interests :
> But affliction often leads men to prepare for eternity ; because it disposes to serious thought—weans them from the world—and leads them to attend to divine things ; therefore,
> Affliction is sometimes a blessing to men.

The Orations of Cicero afford many examples of this form of syllogism.   His oration in defence of Milo, who had slain Clodius, has been noticed as a very happy instance.   His major proposition is, that it is lawful for one man to kill another who lies in wait to kill him ; this he proves from the custom of nations, from natural equity, and by examples.

His minor proposition is, that Clodius lay in wait for Milo ; this he proves from his arms and guards : and then he draws his conclusion, that it was lawful for Milo to kill Clodius.

Sometimes the major proposition is self-evident, while the minor only needs confirmation : in this case, it will be sufficient to prove the latter ; thus,

> All useful studies deserve encouragement :
> Logic is a useful study, because it assists us to detect error, and to reason accurately ; therefore,
> Logic deserves encouragement.

The minor premise in this last example, and both the major and minor in the other instances of the Epichirema given above, are evidently *enthymematic,* and may be formed into regular syllogisms, as was shewn when treating of the Enthymeme. This abbreviated mode of reasoning can be so easily thrown into the syllogistic form, that explanation is unnecessary.

5. *Induction.* This is merely an abridged mode of stating an argument, which, when drawn out in due form, is purely syllogistic. By this method of arguing, we infer *universally* concerning any subject that which we had before affirmed or denied *separately* of all its individual parts or subdivisions. Thus, if we suppose the whole tribe of animals subdivided into men, beasts, birds, insects, and fishes, and then reason concerning them in this way : " All men have a power of beginning motion ; all beasts and birds have this power ; all insects and fishes have this power ; therefore, all animals have a power of beginning motion :" this argument is called an *induction.* When the subdivisions are just, and the enumeration perfect, the *induction* is complete, and the reasoning is evidently conclusive. The above argument, however, is nothing more than a string of syllogisms in *Barbara,* expressed in this abridged form. They can so easily be reduced to regular syllogisms, that it is not necessary to give an example.

CHAPTER IX.

OF FALLACIES.

WE must now turn our attention to the nature and varieties of fallacious reasoning. Any unsound mode of arguing, which demands our assent, when the matter is not proved; or seems to be decisive of the question in hand, when in fairness it is not; is called a *Sophism*, or a *Fallacy*. The name *Sophist*, which is now given to persons who knowingly adopt this fallacious mode of arguing, was not originally considered a term of reproach. It was given to those who were renowned for their wisdom, or for their skill in any of the arts and sciences; and had then nearly the same signification that *Philosopher* has at the present day. But when the art of wrangling took possession of the Schools, and disputants arose whose only object was to entangle their opponents, and who contended for victory, not for truth, this name became their appropriate title; and the fallacious arguments which these persons used were called sophisms. As this method of deceptive reasoning is still prevalent, and is the fruitful cause of numerous errors, it is of great moment that we become acquainted with the doctrine of Fallacies;—not that we may know how to make use of *apparent* arguments, either to convince ourselves, or to endeavour to convince others; but that we may learn to detect, and expose, and avoid them. We shall therefore range them under distinct heads; analyse the process that takes place in each; and point out the deception that lurks in them.

Fallacies have been divided by Aristotle into two great classes; those in the *matter*, and those in the *form:* the latter he denominated *Fallacia in Dictione;* the former *Fallacia extra Dictionem*. It is, perhaps, impossible to frame any division of Fallacies that shall be perfectly free from objection; or to lay down any rules that can be applied, with mechanical readiness, and absolute certainty, in detecting and exposing them. The elliptical form in which all reasoning is usually expressed, and the involved and oblique manner in which a fallacy is generally conveyed, render it sometimes doubtful,

or at least a matter of mere arbitrary choice, to which class it should be referred. Still it is of importance to classify and describe these erroneous modes of arguing; and, although, in the practical detection of them, much must of course be left to natural and acquired acuteness, still, a correct view of the subject will be of material service.

In every Fallacy the conclusion either does or does not follow from the premises. Where the conclusion does *not* follow from the premises, it is evident that the fault is in the reasoning. All fallacies of this kind must, therefore, be considered Logical, because they violate the rules of Logic : and their fallaciousness is exhibited by the mere *form* of the expression, without any regard being paid to the meaning of the terms. In other cases the fallacy lies concealed in the ambiguity of the Middle term; and though, in such cases, it is seen, by the rules of Logic, as soon as the ambiguity of the middle term is ascertained, that the conclusion does not follow from the premises, yet, to ascertain this ambiguity, attention must be paid to the *subject-matter*, to the *sense* of the term, or the *drift* of the discourse. In these cases, then, Logic only teaches us where to *look* for the fallacy, and on what principles to condemn it when it is ascertained,—without pretending to be able, by any multiplication of rules, to determine the full and exact meaning of every term that may occur. These fallacies, then, are only *partly* Logical; and all that can be done in such cases, is to give some general rules that may be of service in reference to them. Fallacies of this kind we therefore denominate Semi-logical. On the other hand, when the conclusion *does* follow from the premises, we may still be deceived by the assumption of false or doubtful premises, or by a conclusion being drawn which is irrelevant to the subject. All fallacies of this kind are *material ;* they have their origin and place in the *subject-matter* of reasoning, not in the *reasoning process.* They are, therefore, called Non-logical ; and, although it is vain to expect that any system of rules will enable us to ascertain infallibly the meaning of every term, and the truth or falsity of every proposition, still, even in these cases, much assistance may be gained from logical rules, and from the mental habits which a diligent study of them tends to produce. We shall, therefore, first

consider those fallacies that are *Logical ;* secondly, those that are *Semi-logical ;* and thirdly, those that are *Non-logical.*

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SECTION I.

Of Logical Fallacies.

The rules already laid down will enable us to detect the fallaciousness of all apparent arguments in so far as the mere form of the expression is concerned. If we have an undistributed middle ; or an illicit process of the major or minor ; or negative premises ; or an affirmative conclusion from a negative premise, or the contrary ; or if there are evidently more than three terms, we shall be able, by the preceding rules, at once to detect and expose the fallacy. When these false arguments are singled out, and individually made the subject of careful examination, it is comparatively an easy work to detect the sophistry that lurks in them. But, it must be remembered, that fallacies most frequently occur in extended discussions, expressed in an eliptical and disguised manner ; and that every effort is used by the Sophist to conceal the weakness of his arguments, and to draw away attention from them. Nothing, then, will be so serviceable in detecting real logical fallacies, as a thorough knowledge of the rules on which all just reasoning depends, and good sense and ability in applying them with promptness and accuracy.

Of course, it would merely be repeating what has already been laid down, were we to illustrate pure logical fallacies by examples. But there is one mode of fallacious reasoning which may, with great propriety, be referred to this head. We refer to that common error of supposing the *conclusion* false, because the *argument* is unsound : or, of supposing the *premises* true, because the *conclusion* is a truth. If any person argues for the existence of a God from its being universally believed, another might perhaps be able to refute the argument by producing an instance of some nation destitute of this belief. The argument in this case ought, therefore, to *go for nothing ;* but, it may be thought by some that it ought

to go much further. They may suppose that it has *disproved the existence of God ;* while it has only destroyed an unsound argument. In this case, the person who draws such an inference is guilty of violating the laws of correct argumentation, which is at once seen by an examination of his reasoning. His argument expressed at length stands thus :—

> Whatever is universally believed must be true :
> The existence of a God is not universally believed ; therefore,
> The existence of a God is not true.

But this syllogism is a mere fallacy, because we have here an *illicit process of the major.* We have the term "true" distributed in the conclusion, by being the predicate of a *negative proposition ;* while it is not distributed in the major premise, being there only the predicate of an *affirmative proposition.* The argument is, therefore, unsound.

Again : were any person in this instance, to argue from the truth of the *conclusion* to the truth of the *premises*, the reasoning would still be fallacious. Thus,

> Whatever is universally believed is true :
> The existence of a God is true ; therefore,
> The existence of a God is universally believed.

In this case we have the Fallacy of *an undistributed middle;* because the middle term "true" is neither the subject of a universal, nor the predicate of a negative proposition. The argument is, therefore, inconclusive.

When the conclusion is a known truth, it is sometimes very difficult to perceive any fallacy in an apparent argument ; and, when it is discovered, it is often difficult to expose its fallaciousness, especially to those who are unacquainted with the reasoning art. Perhaps, in such cases, the best mode is to bring forward a similar fallacy, the conclusion of which is obviously absurd, and thus expose and refute the unsound argument. Many would not perceive any fallacy in the following unsound argument, especially if enveloped in a cloud of words ;—

> Every rational agent is accountable :
> Brutes are not rational agents ; therefore,
> Brutes are not accountable.

But this apparent argument corresponds exactly with the
following, the absurdity of which all will immediately perceive
and admit :—

> Every horse is an animal :
> Sheep are not horses ; therefore,
> Sheep are not animals.

Again :

> All good generals are beloved by their soldiers :
> Napoleon was beloved by his soldiers ; therefore,
> He was a good general.

This unsound argument corresponds exactly with the fol-
lowing, the absurdity of which is manifest :—

> All vegetables grow :
> An animal grows ; therefore,
> An animal is a vegetable.

These fallacies evidently do not conform to the laws of cor-
rect reasoning.   In the one case, we have an *illicit process of
the major;* in the other, a *non-distribution of the middle term.*
In all these cases the fallacy is evident at once from the mere
form of the expression, without any regard being paid to the
meaning of the *terms.*   This may be seen by subtituting mere
symbols for these propositions ; thus,

Every A is B : C is not A ; therefore, C is not B.

Again :

Every A is B : Every C is B ; therefore, Every C is A.

These, therefore, are evidently pure Logical Fallacies.

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SECTION II.

Of Semi-logical Fallacies.

There are, however, many apparent arguments, the falla-
ciousness of which cannot be perceived by the mere form of
the expression.   They are couched in equivocal or ambigu-

ous terms; and the fallacy can only be detected and exposed by a careful examination into the *sense* of the terms employed, and by pointing out their ambiguity. This, it must be confessed, is the most fruitful source of error in reasoning; and, as it is impossible that any system of rules can be devised which can clear up the ambiguity of every term, numerous complaints have been made against Logic, that it leaves the greatest difficulty in reasoning untouched. But, it must ever be kept in mind that the proper business of Logic is with the *laws of correct Reasoning;* and that it treats of *Terms* and *Propositions* only in a secondary way, and in subserviency to this its principal object. Some of its friends may have raised expectations which they could never satisfy, by laying down " rules for attaining clear ideas," and for " guiding the judgment in the search after truth ;" but no single science is capable of performing what has thus been attempted. Yet Logic, although it cannot perform impossibilities, may, nevertheless, materially aid us in this important matter. It cannot remove ambiguity from every term, but it can teach us where to look for the ambiguity. Hence, we find, it directs us to the *middle term,* as the one in which the ambiguity, which contains the fallacy, is most likely to be found. In this case, Logic teaches us not how to find the fallacy, but where to seek for it, and on what principles to condemn it when it is discovered. The fallacies that come under this head are not, therefore, properly speaking, logical ; because the form of the argument may comport with the laws of correct reasoning, while the sophism lurks in an ambiguous term. To discover this ambiguity, attention must be paid to the *subject-matter* of reasoning, more than to the reasoning process. Hence the fallacies that come under this head are called merely semi-logical ; and to this class are to be assigned all those cases in which the middle term is ambiguous.

In Logical fallacies the extremes are compared with *two parts of the same terms;* but in those now to be considered they are compared with *two different terms;* because the middle term is used in different senses in the two premises. Now, although the rules of Logic cannot alone prevent this ambiguity, they can point out where the fallacy is to be found; and thus materially aid us in detecting and exposing it. It

may be useful, then, to classify and describe the different kinds of ambiguity, that are likely to be met with, and to point out the deception to which they give rise.

It is, certainly, a much easier task to give examples of the various fallacies, than to detect them in ordinary practice. In the former case they are detected already; and, by placing the two premises in juxtaposition, their absurdity appears evident, even to the inattentive and uninformed. But, in common practice, the premises are generally kept at as great a distance as possible from each other; the weak part is carefully concealed; and the whole is enveloped in a cloud of words, that renders deception comparatively easy. Although, then, the examples that will be given may appear so evident that they could scarcely impose upon the most unwary; and although it may seem almost trifling to point them out, or dwell upon them; yet to classify and describe these fallacies is not so unimportant as some have attempted to represent. The mental habits thus formed are of immense advantage; an acquaintance with fallacious reasoning will put us on our guard, and prevent us from either using it ourselves, or from being imposed on when it is employed by others. We proceed, therefore, to enumerate and describe the semi-logical fallacies. Of these the most important are the following :—

1. *Fallacia equivocationis.* This fallacy takes place when one of the terms in an argument has *in itself*, from its own equivocal nature, two significations. Thus,

> The dog barks :
> But the dog is a star; therefore,
> A star barks.

Or thus;

> The turtle sings :
> But the turtle is a reptile; therefore,
> A reptile sings.

Or again;

> Walking is healthy :
> This man is walking; therefore,
> He is healthy.

In this case we have an ambiguous middle term, which is

used in different senses in the two premises. When the argument is thus stated in the form of a regular syllogism, the absurdity is so striking, from the two premises being placed so near each other, that no person can be deceived by the fallacy. Hence the mere mention of this sophism has often drawn down plentiful abuse on the logician, as if he were occupied with trifles, unworthy of attention. But it should be remembered that in practice the two premises are generally placed far apart, and the gliding from the one sense of the equivocal term to the other is generally managed in a disguised and dexterous manner, so that the ambiguity of the middle term is overlooked. The more slight the difference between the two senses of a term may be, the more is the fallacy likely to escape detection; while the apparent argument will be equally inconclusive, as in the glaring instances given above. In all cases, then, it is of the utmost importance that we particularly examine the *middle term* of an argument; that we fix the precise sense in which it is used; and mark, with the greatest care, the most minute deviation. When a habit of this kind is once formed, we are not likely to be imposed on by the fallacy of equivocation; and its fallaciousness can be exposed by shewing that the middle term means one thing in one premise, in the other, another.

2. *Fallacia amphiboliæ.*—This happens when a sentence employed in reasoning is capable of two meanings, not from the double sense of any of the terms, but from its admitting of a double *construction*. This fallacy can scarcely be exemplified by any regular syllogism expressed in the English language, as the genius of the tongue, when a definite argument is proposed, scarcely admits of this construction. But nothing is more common than this fallacy in ordinary writing, in which some word or words may be referred either to the former or to the latter clause of a sentence, and thus two very opposite meanings be conveyed. The heathen oracles of old afford us many examples of this ambiguity; similar to which is the witch prophecy in Shakespeare,—

"The Duke yet lives that Henry shall depose."

In this sentence the meaning may either be, that the Duke

lives who shall depose Henry, or whom Henry shall depose. When propositions of this kind occur in reasoning, they often cause much confusion and error. The fallacy, however, can easily be detected by paying close attention to the different meanings which the sentence can bear; and all arguments founded on the ambiguity of such propositions may be shewn to be erroneous, by pointing out the four terms of which when drawn out into regular syllogisms, they will be found to consist.

" The ambiguity of the word Infinite is the real fallacy in the amusing logical puzzle of Achilles and the Tortoise, a puzzle which has been too hard for the ingenuity or patience of many philosophers, and among others of Dr Thomas Brown, who considered the sophism as insoluble ; as a sound argument, though leading to a palpable falsehood ; not seeing that such an admission would be a *reductio ad absurdum* of the reasoning faculty itself. The fallacy, as Hobbes hinted, lives in the tacit assumption that whatever is infinitely divisible is infinite ; but the following solution (to the invention of which I have no claim) is more precise and satisfactory :—

" The argument is, let Achilles run ten times as fast as the tortoise, yet if the tortoise has the start, Achilles will never overtake him. To suppose them to be at first separated by an interval of a thousand feet : when Achilles has run these thousand feet, the tortoise will have got on an hundred ; when Achilles has run those hundred, the tortoise will have run ten, and so on for ever : therefore Achilles may run for ever without overtaking the tortoise.

" Now, the 'for ever' in the conclusion means, for any length of time that can be supposed ; but in the premises 'ever' does not mean any *length* of time : it means any *number of subdivisions* of time. It means that we divide a thousand feet by ten, and that quotient again by ten, and so on as often as we please ; that there never needs be an end to the subdivisions of the distance, nor consequently to those of the time in which it is performed. But an unlimited number of subdivisions may be made of that which is itself limited. The argument proves no other infinity of duration than may be embraced within five minutes. As long as the five minutes are not expired, what remains of them may be divided by ten,

and again by ten, as often as we like, which is perfectly com-
patible with their being only five minutes altogether. It
proves, in short, that to pass through this finite space requires
a time which is infinitely divisible, but not an infinite time;
the confounding of which distinction Hobbes had already seen
to be the gist of the fallacy."*

3. *Fallacia compositionis.*—This species of fallacy consists
in assuming that to be true *collectively* which is so only *distri-
butively.* Thus,

> Two and three are an equal and an unequal
> number :
> Two and three are five ; therefore,
> Five is an equal and an unequal number.

Again :

> Three and two are two numbers :
> Five is three and two ; therefore,
> Five is two numbers.

In these examples the middle term is evidently ambiguous,
being used in *the major premise distributively*, and in the
minor collectively. For instance, in the last example, the
middle term is ambiguous, because " three and two " are
taken *distinctively* in the major premise ; and in this sense
that which is affirmed respecting them is evidently true : but
in the minor they are *taken together*, and in this sense what is
affirmed of them is evidently false.

This is a fallacy that prevails to a great extent in the
transactions of every day, and there is scarcely any other with
which men are more likely to deceive themselves. Many have
been induced to indulge in games of hazard, to their utter
ruin, by imposing on themselves by this fallacy. They have
reasoned thus :—

> What is no uncommon occurrence may reasonably be
> expected :
> To be successful in play is no uncommon occurrence ;
> therefore,
> To be successful in play may be reasonably expected.

* " Mill's Logic," vol. ii., pp. 452, 453. This author's chapters on
Fallacies will amply repay repeated perusal.

In this reasoning the middle term is evidently ambiguous ; because, for the major premise to be true, the middle term must be understood as referring *to some one individual ;* for the minor to be true, it must be understood as spoken of *some one or other ;* in the conclusion, as it is applied in practice, it must be understood in the sense of being reasonably expected *by a certain individual.* We have here, then, the fallacy of Composition, supposing that to be true in reference to every person who engages in play, which is only true of some individual. The fallacy evidently lies in the ambiguity of the middle term, and may be exposed by shewing that there are in reality two middle terms, with which the premises are compared.

The form in which this fallacy is most commonly employed, is to establish *separately* some truths concerning each single member of a certain class, and then to infer the same of the whole *collectively.* Thus, infidels have laboured to prove concerning *some one* of the miracles recorded in the Scriptures, that it might have been the result of some accidental conjunction of natural causes; then they infer the same respecting *another ;* and so on ; till at last they infer that thus it might have been respecting them *all.* But this is the same as if they were to argue thus :—" It is not very improbable one may throw sixes in any one out of a hundred throws ; therefore, it is no more improbable that one may throw sixes a hundred times running."

4. *Fallacia divisionis.*—This fallacy is nearly allied to the preceding, being merely the reverse of it ; and takes place consequently, when we affirm of anything in a *divided* sense what is only true of it *collectively.* For example :—

> These persons can lift ten tons : .
> This man is one of these persons ; therefore,
> This man can lift ten tons.

Again :

> Five is one number :
> Three and two are five ; therefore,
> Three and two are one number.

In this case, in the *major premise,* the middle term is taken

collectively ; and in the *minor,* it is taken *distributively.* It is, therefore, merely the reverse of the preceding, and may be detected and exposed in the same way.

This fallacy often turns on the ambiguity of the word " all," which may, however, be dispelled by substituting for it the word " every," or " each," where that is its true signification. Sometimes " all " is taken in a *collective* sense in the major premise, while a conclusion is drawn which requires that it should be taken in a *distributive* sense. Thus,

> All the peaches from that tree are worth fifty shillings :
> This is a peach from that tree ; therefore,
> This peach is worth fifty shillings.

Again : this fallacy takes place, when the word "all" is made in one premise to refer to a *species,* and in the conclusion to *iudividuals.* Thus,

> Nothing that was in Noah's ark perished in the flood :
> All animals were in Noah's ark ; therefore.
> No animals perished in the flood.

The fallacy in this case may be dispelled by shewing that, in one case, the reference is to all *kinds* of animals ; in the other, to individuals only.

5. *Fallacia Figuræ dictionis.* This fallacy takes place when a term is introduced in an argument which resembles in *sound* the one for which it is substituted, but not in *sense.* Men generally take for granted that *paronymous* words, that is, those which resemble each other, which have the same root, or are connected with each other by the grammatical affinity of language, must have a correspondent meaning. This, however, is by no means the case universally ; and when a term is introduced which appears to be equivalent, when in reality it conveys a very different meaning, the Sophist easily succeeds in his deception. It is scarcely possible to exhibit, in strict logical form, a fallacy of this class, which is at all likely to impose on persons possessed of merely moderate shrewdness ; because by doing so, it would be seen at once to have two middle terms in sound as well as in sense. Yet nothing is more common in practice than this fallacy. The terms employed in

any lengthened argument are continually undergoing a change, in order to afford pleasing variety, or to subserve the purpose of taste or convenience; and, provided the *meaning* is preserved unaltered, this is not to be deemed a fault, but a beauty in composition. No objection can be justly made to the following syllogism, although there is a considerable alteration in the terms employed:

> An incendiary should be punished with death:
> This man has set his neighbour's house on fire; therefore,
> He deserves capital punishment.

In this case the changes that are made are perfectly allowable; because they proceed on the just assumption, that to be an incendiary, and to set his neighbour's house on fire—to be punished with death, and to suffer capital punishment, are, respectively, precisely equivalent expressions. This kind of liberty is perfectly allowable; and to be deprived of it would often prove a very great inconvenience. But the fallacy which we are considering consists in the abuse of its liberty; as may be seen by the following example:

> Theorists are unsafe guides:
> This man has formed a theory; therefore,
> He is an unsafe guide.

Here the fallacy lies in insinuating that he who forms a *theory*, using the term in its proper acceptation, must be a *theorist*, meaning one who revels in the airy fictions of his own imagination. But the sense commonly attached to the latter word is not at all implied in the former. They are, indeed, derived from the same root, and resemble each other in sound, but cannot, on any account, be admitted into an argument as equivalent expressions.

Sometimes this fallacy lurks not in the ambiguous middle term, but in one of the terms of the conclusion. In this case, the conclusion that is drawn will not be at all what the premises warrant, although it may seem to be so, by the resemblance which the term artfully brought in appears to have to the one for which it was substituted. In former days, women were burned alive for the crime of witchcraft, on evidence similar to the following:

To be suspected of sorcery is a *presumption* of guilt :
This woman is suspected of sorcery ; therefore,
We may *presume* that she is guilty.

The fallacy in this case proceeds on the supposition that
there is an exact correspondence between *presume* and *presumption.* This, however, is not a just supposition ; because
"presumption," in the one premise, means evidently only a kind
of *slight suspicion ;* whereas, " to presume " is used in the conclusion, as it is commonly employed, to express *absolute belief.*

There are innumerable instances in which words are thus
supposed to have exactly the same meaning, when in reality
this is a false assumption, which may lead to very serious error.
And the more slight the variation, the more likely is the fallacy to deceive, because persons are thereby thrown more off
their guard. In order to detect these fallacious arguments, it
is of great moment that we endeavour, by every means in our
power, to obtain a correct knowledge of words, in all their
varieties and shades of meaning ; and, more particularly, that
we become acquainted with synonymes and pseudo-synonymes,
as an accurate acquaintance with them will be of the greatest
service in this respect. In order to refute these fallacies, after
they have been thus detected, we must point out the different
meanings which the words bear ; and, by varying the construction, so that it may agree with the one word but not with the
other, shew that, in the case in hand, they are not synonymous.

Sometimes this fallacy arises from a word being used at one
time in its *customary,* and at another, in its *etymological* sense.
Thus it has been argued that it is idle to speak of eternal or
immutable " *truth,*" because this word is derived from " to
trow " that is, *to believe.* Assuming that its right meaning
must correspond exactly with the strict, original sense of this
verb, it has been contended that the one must be as fluctuating
as the other. The best way to expose this kind of sophism is
to bring forward another, founded on the same principle, the
absurdity of which will be at once manifest. Thus, in reference to the above fallacy, it has been well replied, that the
Sophist might have censured, on as good grounds, the absurdity of a person's saying he had sent a letter by the "*post ;*"

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because a post, in its primary sense, is a pillar; or have insisted that "Sycophant" can never mean anything but "Fig-shower."

As this fallacy is sometimes founded on the *etymology*, so is it frequently on the *prosody* of a language. In some languages the *accent* often completely alters the signification of a word. Thus in the Latin words *occĭdo* and *occīdo*, the meaning is completely changed, according as you put the short or the long accent on the penultima. The same may be remarked of numerous provincialisms in the English language; and in some parts of Scotland there are many words which, as commonly pronounced, seem to have made a fair exchange of significations. Now, sometimes the Sophist seizes on these distinctions, trifling though they may seem, and makes them the foundation of his fallacious reasoning; and although the mere directing the attention to these cavils is sufficient to refute them, it is astonishing how much they sometimes mislead the unthinking multitude. In these cases an *ambiguous middle* is the cause of the Fallacy.

6. *Fallacia accidentis.* This fallacy takes place when a person argues for or against anything, from what is merely *accidental*, instead of from what is *essential* to the subject. For example, were any person to object to the doctrine of fallacies, that the study of it is dangerous, because it furnishes the Sophist with weapons for his fallacious disputations, this would be a fallacy that might properly be referred to this class; since it is arguing against a useful branch of study, merely because it may happen to be abused. Such a sophism may be easily refuted by pointing out the difference that exists between the thing itself, and the mere accidental concomitants against which the objection is made.

This mode of fallacious reasoning must also be referred to an ambiguous middle. The middle term is used, in one premise, to signify something considered *as to its essential properties;* and, in the other premise, it is considered as implying that its *accidents* are taken into account with it. Thus,

What is sold in the market is the food of man :
Undressed meat is sold in the market; therefore,
Undressed meat is the food of man.

In this instance the middle term, in the major premise, is understood, *as to its essential properties ;* in the minor, *as to its accidental circumstances.*

Again :

> Christianity existed from the days of the Apostles :
> Protestantism did not exist from the days of the Apostles,
>   but only from the time of Luther ; therefore,
> Protestantism is not Christianity.

This is evidently a fallacy ; and the error lies in insinuating that what is true of any subject considered simply in itself, must be true likewise of it in all its particular modifications. It is true, as stated in the major premise, that Christianity existed from the days of the Apostles ; but it is not true, as is *implied* in the minor, that all its possible accidental circumstances existed from that time also. This ambiguity is the cause of the fallacy ; and by pointing it out, the sophism will be exposed. Perhaps a fallacy of this kind may be most effectually refuted, by bringing forward another, on a similar principle, the absurdity of which will be at once manifest. Thus,

> Sir Robert Peel existed last century :
> The present First Lord of the Treasury did not exist last
>   century, but only from the time of his appointment to
>   this high office ; therefore,
> Sir Robert Peel is not First Lord of the Treasury.

By thus bringing forward a parallel case, all such sophisms may be, in a popular manner, triumphantly refuted.

7. *Fallacia a dicto secundum quid ad dictum simpliciter ; aut vicissim.* This fallacy is nearly allied to the preceding, and takes place when any person argues for a thing taken in an *absolute sense,* when it is only true in a *restricted sense ;* or the contrary. The examples given of it are like the following: "An Ethiopian is white as to his teeth ; therefore, he is white." "A man in particular circumstances acted prudently; therefore, he will act prudently in all circumstances." Or thus ;

> Prodigies and omens are not to be believed :
> Livy in his Roman history describes omens and prodigies ;
>   therefore,
> Livy's Roman history is not to be believed.

All these fallacies can be easily solved by shewing that a
thing may be true in some respects, while it is not so in others ;
or, that it may be true considered simply in itself, while it is
not so, viewed in other circumstances.

Again : this fallacy may take place by a person's arguing
from what is true *absolutely*, to prove the same thing in *par-
ticular circumstances:* thus,

> All men have a right to their personal liberty :
> A madman is a man ; therefore,
> He has a right to his personal liberty.

The fallacy in this case is nearly the same as the *fallacia
accidentis.* The sophism lurks in the ambiguity of the terms,
and may be exposed by pointing out the difference that exists
betwixt things in their absolute nature, and as necessarily modi-
fied by special times, places, and circumstances.

" Of this nature is the fallacy in what is called, by Adam
Smith and others, the Mercantile Theory in Political Economy.
That theory sets out from the common maxim, that whatever
brings in money enriches ; or that every one is rich in propor-
tion to the quantity of money he obtains. From this it is con-
cluded that the value of any branch of trade, or of the trade
of the country altogether, consists in the balance of money it
brings in ; that any trade which carries more money out of the
country than it draws into it, is a losing trade ; that therefore
money should be attracted into the country, and kept there, by
prohibitions and bounties ; and a train of similar corollaries.
All for want of reflecting, that if the riches of an individual are
in proportion to the quantity of money he can command, it is
because that it is the measure of his power of purchasing
money's worth ; and is, therefore, subject to the proviso, that
he is not debarred from employing his money in such pur-
chases. The premise, therefore, is only true *secundum quid;*
but the theory assumes it to be true absolutely, and infers,
that increase of money is increase of riches, even when pro-

duced by means subversive of the condition under which alone money is riches."*

8. *Fallacia plurium interrogationum.* This fallacy consists in asking several questions, which appear to be but one, in such a way, that whatever *one* answer is given, being of course applicable to only *one* of the questions, may be interpreted as applied to some one of the others. Thus, if asked, " Are virtue and vice desirable ? " Whether you reply, Yes, or No, you are equally entangled. If, however, you reply to each question separately, you detect and expose the fallacy.

If the several questions that are proposed together, are avowedly brought forward as *distinct* questions, there is no fallacy in the case ; for it is just as fair to put two or more distinct questions in this way, as it is to assert a string of distinct propositions, connected together by the laws of grammar. It is only when the questions are put in such a way as shall elicit *one* answer to the whole apparent question which can only be correctly answered by several, that this fallacy is employed.

Sometimes the fallacy turns on some *equivocal term* artfully introduced into the question. Nothing gives so much life and apparent force to sophistical reasoning as to state one of the premises of an argument in the form of a question ; and then, presuming that it is admitted, to fill up the rest of the argument as may best suit the person's purpose who is desirous to deceive. If, then, one of the terms in that question be ambiguous, whichever sense the opponent takes up and replies to, the Sophist assumes the *other* sense in the argument which he uses in reply. Thus if it be asked, " Is anything vicious expedient ? " whatever answer is given to this question, whether in the negative, or the affirmative, a fallacy may be founded upon it, from the ambiguity of the term *expedient.* Sometimes this term means " conducive to temporal happiness ; " sometimes " conducive to the greatest good." If the answer be in the *negative,* then the Sophist might argue thus,

Whatever is vicious is not expedient :
Whatever conduces to temporal happiness is expedient ; therefore,
Whatever conduces to temporal happiness is not vicious.

* Mill's " Logic," vol. ii. p. 436.

If the answer be in the affirmative, he may reason thus :

> Whatever is expedient is desirable :
> Something vicious is expedient ; therefore,
> Something vicious is desirable.

In these cases care must be taken to find out where the ambiguity lies ; and by exposing it, the fallacy will be dissipated.

This fallacy sometimes takes place also by employing a term in the question, in such a way, that it may be uncertain whether it is *distributed* or not ; so that here again, whatever answer is given, the reply may be misrepresented and disproved. For instance, if it be asked, " Did Constantine embrace Christianity from a conviction of its divine origin ?" the meaning may either be, " was this his *sole* reason for doing so ?" or " was this only *one* of his reasons ?" In the first case, the term is considered as distributed ; in the other, not ; and whatever answer is given may be perverted by the Sophist.

In all the above classes it will be evident, from a careful examination of each of them, that the fallacy lurks in *ambiguous terms.* They are therefore all placed under the head of Semilogical Fallacies. It must, however, often be a matter of mere arbitrary choice to which of these classes any individual Fallacy should be assigned.

SECTION III.

Of Non-logical Fallacies.

The Fallacies now to be considered are those in which the conclusion *does* follow from the premises. In the other two classes the fallacy lurked, in some way or other, in the *connexion* which the conclusion had with the premises. In this class, however, the connexion between these is correct ; the one follows justly from the other : and the sophism is to be found neither in the violation of logical rules, nor in the ambiguity of equivocal terms. The fallacy in the present class of argu-

ments must be sought for either in the *Premises* that are assumed, or in the *Conclusions* that are drawn from them. They are therefore fallacies *Extra Dictionem*. In this case the fallacy consists not in the process of reasoning, nor in the ambiguity of the terms, but in the *matter* about which the argumentation is taking place. Such fallacies are therefore called *Non-logical*, because no rules which Logic lays down can themselves enable us to detect and expose them. Under this head all those Fallacies may be ranged with result from the *Premises* being unduly assumed, or the *Conclusion* not being the one required. The following may, therefore, be specified.

1. *Fallacia non causæ pro causa.* This fallacy consists, as it is generally expressed, in assigning an event to a wrong cause—an error into which men have always been prone to fall. Many of the doctrines of ancient philosophy are reducible to this head ; as, for instance, when the Peripatetics gravely informed us, that " nature was terribly afraid of a vacuum, and that this was the cause why water would not run out of a long tube, if it were turned upside down."

This fallacy prevails to a great extent among the ignorant and superstitious. If a comet appears, or an eclipse of the sun or moon takes place, it is customary for them to look upon these natural phenomena as the forerunners of war, pestilence, and famine. If a person has been guilty of some crime, and shortly after meets with some temporal calamity, the one is at once made the cause of the other. On the other hand, if a person is involved in a series of afflictions, they immediately conclude that these are judgments come upon him for his iniquities. But all these conclusions are mere sophisms, without any solid basis on which to rest.

Many of the popular objections brought against Christianity are to be referred to this head. All the persecutions that have been the disgrace of the professing Christian Church ; all the numerous sects and parties into which the Christian world is divided ; all the inconsistencies and wickedness of those who have no other claim to be considered Christians, but that they have unrighteously assumed the name ;— these are often brought forward in such a way as to insinuate, that the whole is justly chargeable on Christianity itself ;

although any person that looks at the Christian religion, as it is revealed to us in the Sacred Volume, must at once perceive the fallacy of such insinuations. In this case, the Sophist, generally speaking, contents himself with merely *insinuating* his unfounded objections; for there are few who will come forward and directly charge Christianity with these flagrant evils. But, what fair argument cannot do, a sneer, and a smart inuendo, may often accomplish; and the fallacy imposes even on those who plume themselves on their superior understanding, and freedom from all vulgar prejudices.

If we analyse the process that takes place in this fallacy, we shall find that that which chiefly distinguishes it is the undue assumption of one of the premises. In reasoning from cause to effect, two things are necessary; we must first shew the *real existence* of a sufficient cause; and then we must prove that this is *the* cause that is in operation in this particular instance. These are the two premises in this kind of argument. If, then, either of these premises is unduly assumed, the fallacy now under consideration takes place. Thus; if one should contend from another person's being unjust and cruel, that he will certainly be visited with some heavy temporal calamity; in this case, he assumes a pretended *cause* in the premises, and then he infers, in the conclusion, that the supposed effect will certainly follow. Or, on the other hand, if a person has been involved in some grievous temporal calamity, how common is it to infer that he must have been peculiarly guilty; more so, at least, than those who have not been visited with the same distress. In this case the pretended *effect* is employed to establish the supposed cause. In both these instances the fallacy lies in assuming a premise without having proper authority for so doing. In the one case, a fact that really exists is supposed to be the *cause* of something that is only expected : and in the other, a fact that really exists, is assumed to be the *effect* of something which is only *supposed* to have an existence. In the one case, the Sophist takes for granted a *cause*, in the other an *effect;* neither being self-evident, nor satisfactorily proved.

Sometimes, when both the *pretended* cause and effect are granted, that is, when they both really exist *as facts,* the fallacy lies in assuming a *connexion* between these facts, when

there is no such thing. Thus, if a patient takes a particular medicine, and recovers, how common is it to affirm that he was *cured* by this medicine. In this case the two facts are incontrovertible ; the patient took the medicine ; and he recovered ; but more than this we are not warranted to affirm. The Sophist, however, will go much further ; he will assume that, of these two admitted facts, *the one is the cause of the other*, and thus be guilty of a " *non causa pro causa.*" In all these cases, however, the fallacy lies in the undue assumption of some premise that is doubtful, or unsupported.

When a premise is thus unduly assumed, the great object with the Sophist is to prevent the undue assumption from being perceived ; for, as soon as this is discovered, the fallacy is detected. Very often the doubtful premise is suppressed, as if it were too evident to need proof, or even to be stated. Thus a Sophist might affirm : " There will be war this year, because a comet has appeared ; " and this argument might appear to the ignorant and superstitious sufficiently conclusive ; because the other premise, which is manifestly false, is kept out of view. Let the suppressed premise be directly asserted, and there are few who would be imposed on by the fallacy. Thus,

> Whenever a comet has appeared, a war has taken place :
> A comet has appeared this year ; therefore,
> There will be a war.

By merely stating the argument in this way, the attention is aroused, and the mind is led to consider whether the assertion is *true*, or not ; and as the person may recollect instances in which such an event took place without being attended with this sad consequence, he begins to doubt the assertion, and then very soon discovers the fallacy.

There is another form of this fallacy by which we may often be deceived ; we refer to the very common practice of attributing to a proposition that is really probable, a *greater degree* of probability than rightly belongs to it. This often takes place when, in a long chain of argument, we omit to calculate the probabilities in each successive step. Each step

may have an excess of chances in its favour, and yet the ultimate conclusion may have a great preponderance against it. This has been illustrated as follows :—

> All A is probably B :
> All C is probably A ; therefore,
> All C is probably B.

Now, supposing the truth of the major premise to be more probable than otherwise ; admit that the chances for it are more than $\frac{1}{2}$; say $\frac{4}{7}$; and suppose the chances for the truth of the minor to be greater still ; say $\frac{2}{3}$; then by multiplying together the numerators and the denominators of these two fractions, $\frac{4}{7} + \frac{2}{3}$, we obtain $\frac{8}{21}$, as intimating the degree of probability that belongs to the conclusion. This, however, is less than $\frac{1}{2}$; the conclusion, then, is *less* likely to be true than the two preceding steps in the argument. For example :—

> The reports which this author heard are probably true :
> This which he records is a report which he probably heard ; therefore,
> This statement is probably true.

Suppose the *majority* of the reports he heard, say *four out of seven*, are true ; and that he *generally*, say *twice in three times*, reports faithfully what he heard ; it follows that of *twenty-one* of his reports, only *eight* are true. When there is a lengthened argument of this description, of course the results are still more fallacious. And yet how often are persons deceived by hearing a long chain of probabilities brought forward in support of some conclusion ; whereas each successive link in this chain is weaker than the one that preceded.

The examples given above refer to that form of this Fallacy which is called a "*non vera pro vera*." There is another form, however, which it sometimes assumes, which has been called a "*non tali pro tali*." This takes place when a person argues from a case *not parallel*, as if it were parallel. Thus, from the circumstance that some persons have abused charity, it has been contended that to give alms, in any case, is improper. Because a person, from a particular class of society,

when raised to a station of trust and importance, has acted improperly, it has been argued that to raise any other of that class to the same station, must be attended with similar evil consequences. But, in cases of this kind, the argument rests on the assumption of a perfect *parallelism* in the two cases; whereas there may be some circumstances, absolutely essential, lost sight of, which may vitiate the whole reasoning.

This fallacy, in all its various modifications, consists in having one or other of the premises *false*, that is, unduly assumed. In the "*non tali pro tali*," the *suppressed premise is false*, for it is in this premise that the parallelism is affirmed. And in the "*non vera pro vera*," the *expressed premise is false*. It will often be a mere matter of choice, however, whether to refer any individual fallacious argument to this head, or to that of the Ambiguous middle; still the distinguishing characteristic of this species of Fallacy seems to be that which we have specified.

2. *Petitio principii.* This Fallacy consists in *begging the question*, or taking for granted that which is to be proved. In this case the premise is either manifestly the same as the conclusion, although expressed in different words; or it is dependent on it for its own establishment. The philosopher's proof of his own existence is an example of this fallacy: "*Cogito, ergo sum.*" If a Professor of Divinity were to begin his course of lectures with the doctrine of Divine Inspiration, he must necessarily fall into this fallacious mode of reasoning. For, however true this doctrine may be, and however convincing the arguments by which it can be established, still, in that stage of his inquiries, it cannot be proved to the conviction of his hearers, because he has not yet established other truths from which it must be deduced. Thus, whether he appeals to the promises of Christ to His apostles, or to the express declarations of the apostles themselves, he must take for granted that these promises and declarations were really made; that is, he must take for granted the *authenticity* of the writings in which these promises and declarations are contained. In like manner, if a person should attempt to prove the existence of God from the authority of Scripture, he would be guilty of this fallacy; because the Scriptures derive

all their authority from the fact that they are the Word of God,—which necessarily implies his existence.

"A proposition would not be admitted by any person in his senses as a corollary from itself, unless it were expressed in language which made it seem different. One of the commonest modes of so expressing it, is to present the proposition itself in abstract terms, as a proof of the same proposition expressed in concrete language. This is a very frequent mode not only of pretended proof, but of pretended explanation; and is parodied by Moliere when he makes one of his absurd physicians say, 'l'opium endormit parcequ'il a une vertu soporifique," or, in the amusing doggerel quoted by Mr Whewell,—

> Mihi demandatur
> A doctissimo doctore,
> Quare opium facit dormire;
> Et ego respondeo,
> Quia est in eo
> Virtus dormitiva,
> Cujus natura est sensus assoupire."*

Sometimes, however, it may be perfectly allowable, at the commencement of an argument, to take for granted a premise that is not more evident than the conclusion, or that may be disputed by your adversary, provided you engage fairly to prove that premise afterwards. This, however, should be avoided as much as possible; for if we undertake to prove a proposition by the aid of another, which is itself hereafter to be proved, we are in great danger of falling into the erroneous mode of arguing which we are now considering. The proposition in question becomes a link in the chain, by which we establish that very proposition. The preferable way is first to prove the proposition that is needed for your argument, and then your course is straightforward and plain.

It is also perfectly allowable in an argument to begin by deducing your conclusion from a premise which may be exactly equivalent to the one which is to be proved—provided that no undue advantage be taken as to the matter in question. But the Sophist, in doing this, will endeavour either to blink the question altogether, or, in a flourish of

* Mill's "Logic," vol. ii. p. 460.

words, merely bring forward the same proposition, expressed in synonymous terms, which may have no resemblance in sound, or connexion in etymology, and yet mean precisely the same thing. Thus, were the question in dispute whether "Christian unity is alone preserved in the Roman Catholic Church;" and were a member of that communion to argue in the following manner, he would be guilty of this fallacy : "Examine the Catholic Church in every age and in every country, and you will find it precisely the same. From his Holiness the Pope, down to the meanest member of the true Church—from the days of the Apostle Peter, down to the present time, a sacred unity has ever been preserved." This is evidently a mere fallacy; instead of *proving* that the Catholic Church possesses and preserves this unity, the Sophist merely asserts and repeats what he ought to have proved. No language is so favourable for this kind of fallacy as the English tongue, from the numerous synonymous terms which it possesses, and which have, in many cases, no other point of agreement except their meaning.

There is another form of this Fallacy which is called *Reasoning in a Circle*, which must necessarily ever be unfair. This happens when the same propositions are made alternately premises and conclusion. The following argument will exemplify this fallacious mode of reasoning. Some have contended that the Scriptures are so ambiguous and obscure, that, when left to themselves, they are more likely to generate error than truth, to foment division rather than to produce unanimity and agreement. To this objection it has been eloquently and triumphantly replied : "What is the reason that the Scriptures may not be trusted alone? 'Why,' say our opponents, 'they are liable to be misinterpreted, and wrested to countenance the respective opinions and practices of different sects and parties.' Be it so : we admit this to be possible ; but what remedy can be devised to obviate this evil? Is their use to be entirely proscribed? 'No,' say our opponents, 'but they must be invariably accompanied by another book, which may be considered in the light of an authorised commentary.' But we would ask again, Are we to judge of this commentary? or are we to receive it simply on the ground of authority, and upon the principle of implicit faith? or is any exercise of

private judgment permitted to us? If it be replied that it is not, this is nothing less than open and barefaced Popery. If the judgment is to be exerted at all, and everything is not to be taken on trust, their commentary must be judged of by some criterion; and what can that be but the Scriptures? The Scriptures must then, after all, be appealed to before it is possible to determine on the correctness of the commentary; and thus we are led back to the precise point from which we set out, that is, the examination of the Scriptures. According to the views of our opponents, we are either to admit the principle of implicit faith to its utmost extent, which is open and avowed Popery; or we are first to interpret the Scriptures by the commentary, and then judge of the commentary by the Scriptures. This is the circle out of which it is impossible for our opponents to escape, and they may be lashed round it to all eternity!"

This fallacy evidently consists in the undue assumption of a premise equivalent to the conclusion, or necessarily dependent upon it. It is therefore very similar to the preceding; and the only way in which it can be detected, is, to observe narrowly the *Premises* which the Sophist may use; to strip them of their disguise; to point out the sameness of that which he assumes with that which he establishes; and to require proof for what has been unduly taken for granted.

3. *Ignoratio elenchi.* This is the Fallacy of an Irrelevant Conclusion; and it takes place when the proposition which you prove is not the *contradictory* of your opponent's assertion. Thus, if a person were convicted of a crime in court, and his advocate were to attempt to disprove the charge, by proving that the prisoner had been greatly injured—that he was a person of excellent character—and that nothing of the kind had ever before been laid to his charge, he would be guilty of this fallacy; for none of these points were the matter under examination, and they might be all true, while his guilt remained nevertheless.

It often happens that this fallacy turns on some *ambiguity* in the proposition to be established. The Sophist sees that he cannot prove the matter in question in the sense in which it ought fairly to be understood; he therefore dexterously

changes the meaning of the sentence, and by establishing the proposition in its altered form, imposes on the unwary. Thus, if a person should attempt to prove that the inhabitants of a civilised country *were not free*, and in proof of this should prove that they *must be subject to the laws*, he would be guilty of this fallacy; because the truth of this conclusion does not at all invalidate the former statement, unless it be viewed in an unusual sense, and not in that sense in which it would generally be understood.

This fallacy is most frequently resorted to in cases of protracted dispute. When the Sophist finds that he cannot maintain his point, he shifts the ground of argument to some other view of the subject, which he can more easily defend. Sometimes he may substitute a *particular* for a *universal* term; or he may prove something to be *possible*, when it ought to have been proved *probable;* or *probable*, when it ought to have been proved *necessary ;* or he may prove it to be *not necessary*, when it should have been proved *not probable;* or *improbable* when he should have shewn that it was *impossible.* When he has proved this point, which, through his dexterous management, may not be perceived to be at all different from the one in dispute, he may exult over his adversary as having gained the victory, while he has only been imposing on him with the fallacy we are now considering.

Sometimes, too, this fallacy consists in proving or disproving only *a part* of that which is required, and then drawing a conclusion as if the whole had been taken into consideration. Nothing affords a better example of this fallacious mode of reasoning than the present system of reviewing works as they issue from the press. Almost every Review abounds with this fallacy, whether the Review be favourable or unfavourable. In the one instance, the objectionable parts of the work are overlooked, and the parts that are not so liable to objection are brought forward and dwelt upon ; and in the other case, the excellencies of the work are kept ont of sight, and those parts that are most objectionable, or most easily refuted, are made the subject of animadversion ; and then a conclusion is drawn, which may be correct enough in so far as those parts of the works are considered to which the Reviewer particularly

calls the attention of his readers, but which is quite unjusti-
fiable when the work is viewed as a whole.

It is therefore considered a maxim, that we never should
advance more in argumentation than can be *well* established :
for, in this way, we give our adversary an advantage over us.
The truth of a proposition is not to be determined by the
number of arguments that can be brought forward in its favour,
and by the soundness and conclusiveness of these arguments,
whether they be many or few.   If any fallacy is admitted,
either through inattention, or by design, it will, in the end, do
more harm than good.   However specious these fallacious argu-
ments may be in our own eyes, or in the estimation of our own
party, when closely examined by our adversary, they can
scarcely escape.   Hence the injury done to a cause by a weak
advocate : the cause itself will appear to be overthrown, when
his futile arguments have been exposed and answered.   In
controversy, then, we ought to state what is *true*, rather than
attempt to bring forward *all* that can, with any degree of
plausibility, be said on the subject.   If there are objections to
what we advance, and we are able to answer them satisfactorily,
let them be stated *in their full force,* since it is better they
should be fairly stated by ourselves, than by an uncandid op-
ponent : if we perceive that they are *unanswerable,* let us
honestly yield the point, as it will always be found ultimately
the wisest and safest plan to abandon every argument inconsist-
ent with truth.   Were we, therefore, to place ourselves in the
room of our opponent, and examine our arguments as he might
be supposed to do, we should prevent him from gaining the
advantage which he is likely to derive from weak and easily
refuted arguments.

This fallacy is sometimes practised, also, by shewing that there
are *objections* which can be brought forward against the point
in dispute ; and thence inferring that it ought not to be re-
ceived.   If any person can fairly shew that the objections
against it are more numerous and strong than the arguments
that can be brought forward in *favour* of it, the argument may
be considered valid; but the fallacy to which we now refer,
is that of rejecting any proposition or theory merely because it
is not *free* from objections.   This is the fallacy that is most
commonly brought forward by those who attempt to impugn

the divine origin of the Christian Religion; and respecting which the young ought especially to be put on their guard. It has been most ably illustrated and refuted in the following manner. "This is, as has been said, the principal engine employed by the adversaries of our Faith. They find numerous 'objections' against various parts of Scripture, to some of which no satisfactory answer can be given; and the incautious hearer is apt, while his attention is fixed on these, to forget that there are infinitely more and stronger objections against the supposition that the Christian Religion is of *human* origin; and that where we cannot answer all objections, we are bound in reason and in candour, to adopt the hypothesis that labours under the least. That the case is as I have stated, I am authorised to assume from this circumstance, that *no complete and consistent account has ever been given of the manner in which the Christian Religion, supposing it a human contrivance, could have arisen and prevailed* as it did. And yet this may obviously be demanded, with the utmost fairness, of those who deny its divine origin. The Religion exists: that is the phenomenon; those who will not allow it to have come from God, are bound to solve the phenomenon on some other hypothesis less open to objections. They are not indeed called on to prove that it *actually did* arise in this or that way; but to suggest (consistently with acknowledged facts) some probable way in which it *may* have arisen, reconcilable with all the circumstances of the case. That infidels have never done this, though they have had near two thousand years to try, amounts to a confession that no such hypothesis can be devised, which will not be open to greater objections than lie against Christianity."

In order that we may escape being imposed on by the fallacy of objections, we should remember that real and unanswerable arguments may be urged against a proposition that is nevertheless true, and which can be satisfactorily established by a preponderance of probability. In what is called moral or probable reasoning, there may be sound and valid objections on both sides. "There are objections against a *plenum,* and objections against a *vacuum;* but one of them must be true." The question in such cases is, which of two alternatives is the more probable, or on which side the evidence preponderates. Instead, therefore, of attempting to answer every objection which

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the Sophist may bring forward merely to draw off attention from the more weighty arguments which you have advanced, the objector should be called on to frame an hypothesis that may be encompassed with fewer difficulties.

Sometimes also, when irrefragable arguments have been advanced against something which is tacitly admitted to be indefensible, a sophistical refutation may be attempted by bringing forward something that is worse, taking it for granted that this is the only alternative. Thus, if objections are advanced against the Establishment Church, they may be answered by pointing out the evils of Dissent. If a person is blamed for being a spendthrift, he may dilate on the greater enormity of being a miser—as if there were any necessity for his being either. In all these cases the fallacy lies in establishing a conclusion which is irrelevant to the subject.

In order to detect and refute this Fallacy, in all the various forms which it assumes, we should particularly keep the attention fixed on the *Conclusion* that is to be established. The Sophist will generally avoid, if possible, stating at the outset the proposition which he ought to prove. He will rather begin with the premises, and introduce as long a chain of argument as he possibly can before he comes to the conclusion; and, in order that he may the better draw the mind of his opponent from the precise point at issue, he will try, if possible, to suppress it altogether, and conclude the argument by merely stating, "the inference from this is plain;" or, "thus I have established my point;" or, "the position of our opponent is thus completely overthrown." In this way the inattentive are often deceived. If, however, we keep the precise point in dispute clearly before the mind, and neither lose sight of it ourselves, nor suffer our adversary either to wander from it, or substitute anything in its place, we shall generally escape the snare.

We have thus gone through the three divisions of Logic, and unfolded the principles and laws both of sound and sophistical Reasoning. It will be necessary, however, before we close this brief treatise, to subjoin some general remarks on the application of the Science to practical purposes.

ON THE APPLICATION OF LOGIC.

In the preceding Compendium the nature and province of Logic have been explained and illustrated. Although brevity has been particularly studied, it is hoped that the leading principles of the Science have been developed, and that nothing really essential to the subject has been overlooked. Little remains to be said which is not *implied* in the rules and principles already laid down. But the application of these to ordinary practice, if not distinctly pointed out, is liable to be misapprehended. On this part of the subject as many mistakes have prevailed as respecting the nature of the Science itself. As, however, it never was intended that the syllogism, expressed in full length, should be introduced into ordinary practice; and as some writers have affirmed that the rules laid down for distinguishing the conclusive from the inconclusive forms of argument, or the valid Syllogism from the various kinds of Sophisms, are at once cumbrous to the memory, and unnecessary in practice; and, as others have maintained that the Inductive philosophy, or some kind of *rational* Logic, should be introduced in the room of the Syllogism; it is thought necessary to subjoin a few supplementary observations bearing on those points. We shall thus have an opportunity of exposing some of the incorrect notions that still prevail respecting this Science, and of embodying several particulars which, although of great importance in reference to the application of the system, could not with propriety be introduced while the mere theory was under consideration. We shall, therefore, endeavour to define the legitimate province of Logic—examine some new views that have been propounded respecting the nature and functions of the Syllogism—notice the various forms which Reasoning,

though strictly syllogistic in its nature, assumes in popular use
—the evidence on which the validity of these arguments rests
—the obstacles which lie in the way of conviction and belief
—and the connexion which this Science has with rhetorical
studies.   Whether these topics can justly be regarded as a *part*
of Logic may be questioned.   There can be no doubt, however,
but that they are important in themselves ; and as they are
intimately connected with the *application* of Logic, they may
be properly subjoined to the precepts of the Science.

CHAPTER I.

OF THE PROVINCE OF LOGIC.

MUCH of the ridicule that has been so unjustly heaped upon
this Science, has arisen from the mistakes that are prevalent
respecting its legitimate object.   It is customary to represent
the syllogistic art, with its figures and moods, as serving
merely to display the ingenuity of the inventor ; and to furnish
the student with the means of making an artificial and osten-
tatious parade of learning, which has the appearance of great
profundity, but which is in reality destitute of all practical
value.   It has often been urged that syllogistic reasoning is
altogether ineffectual as an instrument for discovering new
facts in science, or for the acquisition of general knowledge.
Hence some writers are fond of bringing forward the Inductive
philosophy in contrast with the Aristotelian Logic ; and dilate
on the advantages to be derived from substituting Induction
for the " Logic of the Schools."

   There is an evident unfairness in this mode of arguing.
It is taking for granted that Induction and the Syllogism
are *two distinct methods of reasoning,* which may be justly
contrasted with each other ; whereas this is by no means the
case.   It has been expressly laid down in the preceding
treatise that the *Reasoning process,* in all cases, and on all
subjects, is one and the same ; and that the Syllogism is *the*
form in which all correct reasoning may be clearly exhibited,

and by which its validity may be ascertained. If, then, Induction be a method of reasoning distinct from the Syllogism, and which can fairly be brought into contrast with it, the foundation of the Syllogistic theory is shaken, and the venerable edifice must totter and fall. But we are not afraid of such a catastrophe. This argument, so frequently, and, apparently, so triumphantly brought forward, is founded in mistaken views both of the Aristotelian and the Baconian philosophy.

When the illustrious Bacon arose to emancipate the world of science and letters from the thraldom of the Schools, he saw that Induction was the natural, and, indeed, *the only* way of discovering new truths, and collecting facts by means of which the sciences might be cultivated and improved. He, therefore, brought back Philosophy to the path of nature and of common sense, and became the Father of that Experimental Philosophy which is unfolded with so masterly a pen in his immortal writings. That the system which he introduced is, in many respects, superior in value and practical importance to the Aristotelian system, we apprehend there are few at the present day who would venture to deny. Still, as they both, in so far as they really differ, occupy a province perfectly distinct from each other, we hold it unfair that they should thus be contrasted, or that the one should be exalted to the disparagement of the other.

In order that this may appear, it is necessary that we glance for a moment at the Inductive philosophy. In his "Novum Organon" Lord Bacon first shews that the Syllogism is of no use in ascertaining new truths; he next classifies and sets in a clear light the sources of error which impede us in reasoning; and lastly he unfolds the right mode in which we should seek after truth, and study nature. This method of philosophising consists in investigating nature by observation and experiment, and ascending from a clear and distinct knowledge of facts and particulars, to those general laws or principles on which they depend. The name *Induction* has been given to it, because, by this means, instances are *brought in,* one after another, to bear on the point in question, till a sufficient number has been collected to establish it into a general law; and when the conditions which are necessary to make the

induction worthy of credit have been fulfilled, the mind is induced to believe the result.

In this method of searching after truth there is nothing that can properly be called new. It is thus that children, and savages, and men in general collect their information. They observe and make experiments; and, from the collation of facts thus ascertained, draw their inferences. But Lord Bacon resolved this universal practice into its principles; and recommended it to the learned who had been led astray for ages by erroneous or perverted systems. In many cases a complete induction cannot be obtained; hence this mode of investigating admits of degrees of conviction, from a mere probability to absolute certainty. When our observation extends to a considerable number of particulars, and no exception takes place, this is considered sufficient to justify belief. But no rule can be laid down to fix the number of instances that may, in every case, be fairly considered sufficient to establish any matter of inquiry. This must depend, in a great measure, on the nature of the subject; on the manner in which the investigation has been carried on; on the skill, information, and acuteness of the observer; and on a variety of other circumstances which the peculiarities of the case can alone suggest. But the following rules were deemed essential, and were laid down to be scrupulously attended to in all inductive investigations:—we must observe with attention and constancy—compare with circumspection and caution—discriminate with acuteness and accuracy—distribute with exactness and regularity—and apply principles already ascertained to the discovery of new truths. This is the method of searching after truth which has been called the Baconian or Inductive philosophy; and the superiority of this branch of philosophy, and the advantage of substituting it in the room of the Aristotelian Logic, is a subject which is, almost in every instance, immediately brought forward, whenever any reference is made to the Syllogistic theory.

The proposition thus advanced, as we formerly remarked, is founded in mistake. It confounds the two perfectly distinct operations that take place in the Baconian method of philosophising; and derives all its apparent force as an argument merely from the ambiguity of a term. From the brief out-.

line of the Inductive philosophy given above, it will be seen that one process which takes place in Induction, is that of *Investigation*, by which, through means of observation and experiments, we obtain *new facts;* another process is that of *Inference*, by which we *draw conclusions* from the facts which we have, by the other process, already acquired. Now, although these two processes are perfectly distinct, the name *Induction* is sometimes applied to the one, and sometimes to the other ; and it is from the ambiguity which has thus arisen that Induction has been so generally considered worthy to rival and supplant the Syllogism.

When viewed as a *process of investigation*, by which we discover new truths, and acquire general knowledge, Induction certainly appears superior to the Syllogism. But, then, in this case, it is not a *process of reasoning*, but a process of *inquiry;* and, in this sense, to contrast it with the Syllogism is evidently unfair. It is by investigation that the *premises* of an argument are obtained ; but this process lies beyond the legitimate province of Logic, which is employed exclusively with the *reasoning process*, or in drawing conclusions from premises of which we are already in possession. This latter process must, therefore, ever remain a perfectly distinct operation from the collecting of facts, or the laying down of premises. They may be both valuable ; and may very properly be studied as mutual aids to each other ; but to set up the one to the disparagement of the other is altogether unfair, since it is in fact condemning one department of science because it does not accomplish the work of another. They have each their separate duties to perform, which the one cannot discharge for the other ; and, as they are not rival systems, they ought not to be set in competition.

But, if we look at the other process which takes place in Induction, that of *deducing inferences* from the facts already obtained by observation and experiment, we shall find that this is a *process of reasoning*, and that, like all other arguments, it is capable of being syllogistically stated. In every case in which we deduce an inference from any fact we have ascertained by observation or experiment, we are employing a syllogism in *Barbara*, with the major premise suppressed. Take, for example, one of Lord Bacon's instances : " The ap-

proach of a hot body increases heat according to the degree of
nearness ; and the case is the same in light, for the nearer an
object is placed to the light, the more visible it becomes."
This, properly speaking, is a mere *assertion ;* but if viewed as
an *argument,* the process is as follows :—In this case it had
been ascertained, in a number of instances, that the nearer a
hot body approached, the greater was the degree of heat ; it
is, therefore, inferred that whatever belongs to the particular
instances that had been examined, belongs to the whole class
to which these instances are referred : and hence the conclu-
sion is drawn that "the approach of a hot body in every in-
stance increases heat according to the degree of nearness."
The argument may be stated syllogistically, thus :—

> Bar-   Whatever belongs to these particular instances,
>   belongs to all that class in which they are
>   included :
>
> ba-   In these particular instances, the nearer the ap-
>   proach of a hot body, the greater is the degree
>   of heat ; therefore,
>
> ra.   In all instances the approach of a hot body in-
>   creases heat according to the degree of nearness.

The same process, so far as *reasoning* is concerned, takes
place when Lord Verulam infers, in the above example, that
"the nearer an object is placed to the light, the more visible
it becomes."   So is it in every instance in which we draw an
inference from our observation of certain known facts.   Thus,
to take another instance from the Inductive philosophy,
"This, and that, and the other flame,—except the flame of
gunpowder, and the like, where compression and confinement
increase its force,—prove strong, vigorous, and generative,
only when they find some cavity wherein to move and play
and exert themselves ; therefore, so do all flames—except the
flame of gunpowder, and the like."

Thus it appears that Induction, *in so far as it is an argu-
ment,* may be, like all other arguments, stated syllogistically.
Whether the induction has been sufficiently ample, and suffi-
ciently accurate, and how far the instances examined may
correspond with the class to which they are referred, must
depend on the judgment, and acuteness, and diligence of the

person who ascertains the facts, and lays down the premises; but this all belongs to the process of *investigation*, which, it should ever be remembered, lies beyond the proper province of Logic. Whether the premises are true or false, the rules of Logic cannot of themselves ascertain. This must be provided for by a competent knowledge of the nature of the subject respecting which the reasoning takes place. But if the premises are *granted*, which in every argument must be the case, or we never could advance a single step in any form of reasoning, then Logic will enable us to ascertain whether or not the conclusion *follows fairly* from the premises. If the Inductive process has been without fault, Logic will ascertain whether or not the *argument* founded upon it be sound or fallacious. It is, therefore, altogether unfair to represent Induction as a method of reasoning superior to the syllogism, since, in so far as it is argument at all, although expressed in a popular form, it perfectly coincides with it, and depends entirely on the *one principle* which Logic unfolds, and on which all correct reasoning must be founded.

Hence we may see how unmerited the obloquy is which has been poured on this study. The legitimate province of Logic is reasoning, not discovery. It never was intended as an instrument for the discovery of what may be strictly called new truths; but merely to unfold the general principle on which correct reasoning is conducted, and to furnish a standard by which the validity of any argument may be ascertained. It has, indeed, been contended that every syllogism must be futile and worthless, because the premises virtually contain the conclusion; and that there is always some radical defect in a syllogism, which is not justly chargeable with involving a *petitio principii.* But this objection, in so far as it is valid, is applicable necessarily to the reasoning process itself, and consequently to *all kinds of arguments.* Whatever form reasoning may assume, the inference that is drawn, if it be at all warranted, *must* be virtually contained in the premises from which it is deduced. The premises in every instance contain a general truth; and then a particular instance, involved in this general class, is evolved by the reasoning process, and is asserted in the conclusion; hence the conclusion never can contain more than is virtually contained in the premises.

Every argument must proceed on some *data ;* and the object of all argumentation is to expand and unfold what is thus granted, so as to bring a person to perceive and acknowledge what he has already admitted. This is the principle on which *all* correct reasoning must necessarily proceed ; and it is the object of the Aristotelian Logic to unfold the *general law* to which every argument may be referred, and by which we may ascertain whether it be conclusive or not.

It is evident, then, that the province of Logic is not to discover truths absolutely unknown, or that are not *implied* in anything with which we are previously acquainted. All these *matters of fact* must be obtained through *information ;* an acquaintance with them must be gained by observation, or experiment, or testimony, or any of those means whereby we acquire general knowledge : but no process of mere reasoning will ever put us in possession of them. No mere process of argumentation could ever inform a person, that the earth is nearly fifty times the magnitude of the moon ; or that Jupiter has four satellites, and that Saturn has a luminous ring. These are facts which must be learned not *without* reasoning, because this mental process enters largely into all the methods by which information is obtained ; but argumentation *alone* is not sufficient, since without observation, or testimony, we have no premises from which such conclusions can be drawn. The discovery of all such *matters of fact* lies without the province of the science of Logic ;—but surely it is not any just cause of reproach that it cannot accomplish what it never was intended to do.

There are some truths, however, which may be elicited by reasoning, and which have been called Logical Discoveries. These are, of course, implied in what we already know ; but we do not perceive or admit them, till they are brought out by argumentation. This process of evolving truths from others already admitted takes place in every act of reasoning ; and it is the province of Logic to analyse this process, to point out the principle on which it rests, and the laws by which it is regulated ; and to enable us to ascertain, as far as the mere process of reasoning is concerned, whether the conclusion is, or is not, a legitimate deduction. In this way vague and inconclusive arguments may be detected, which would probably

otherwise escape notice, especially when involved in a multi-plicity of terms.   To represent such an instrument as desti-tute of all utility, or to speak of it as merely the science of *logomachy*, betrays an utter ignorance of its nature and object. It is reported of Lord Mansfield, that on one occasion, when pleading at the bar, he was confounded and perplexed with an argument which he was convinced was false, but of which he could not detect the sophistry ; and that, upon going home, and throwing the various propositions of which it consisted into the syllogistic form, he thereby discovered the fallacy. The Aristotelian Logic is, therefore, by no means so worth-less, or so injurious, as has been represented.   Had it not been greatly abused, both by its friends and its foes, a system formed on so just an analysis of the reasoning process, and calculated, when kept within its own limits, and employed on its own proper duties, to be of such use, had never been stigmatised and neglected as has unhappily and unjustly been the case.

CHAPTER II.

OF THE NATURE AND FUNCTIONS OF THE SYLLOGISM.

WE have already laid down, in detail, all that is usually deemed necessary respecting the nature and functions of the syllogism. Of late, however, new and rather extraordinary views have been propounded on this subject—supported by superior talent, and very high authority.   It may be proper for us, therefore, now that we are somewhat prepared for the investigation, to give these views a calm and careful consideration.

   The work in which these novel statements are brought for-ward and defended, at greatest length, and with the greatest ability, is unquestionably Mr Mill's "System of Logic," to which we have had already occasion repeatedly to refer, with high but just commendation.   Many of the important discussions with which that able work abounds, may be viewed by the Logician as but remotely connected with his science,—however necessary they may be to the author's professed object, which was, he

informs us, " to embody and systematise the best ideas which have been either promulgated on its subject by speculative writers, or conformed to by accurate thinkers in their scientific inquiries," (Pref. p. 1.) In treating of Logic proper, he appears particularly anxious to reconcile the friends and the foes of the Syllogism. " In the contempt entertained by many modern philosophers for the syllogistic art," he observes, " it will be seen that he by no means participates ; although the scientific theory on which its defence is usually rested, appears to him erroneous : and the view which he has suggested of the nature and functions of the syllogism may, perhaps, afford the means of conciliating the principles of the Art with as much as is well-grounded in the doctrines and objections of its assailants," (Pref. p. 4.) Perhaps it is this laudable anxiety to unite these contending parties, that makes him seem rather at a loss where to fix the boundaries of this science. He admits that Logic "comprises the science of reasoning, as well as an art, founded on that science," (Vol. i. p. 3.) But he is unwilling to receive this as an adequate definition. He pleads for an extension of the province of Logic, so as to "include several operations of the intellect not usually considered to fall within the meaning of the terms Reasoning and Argumentation," (p. 5.) He seems wishful " to define Logic as the science which treats of the operations of the human understanding in the pursuit of truth," (p. 5.) Admitting candidly, however, that if the former definition includes too little, this "now suggested has the opposite fault of including too much ;" he then restricts the province of Logic " to that portion of our knowledge which consists of inferences from truths previously known ; whether those antecedent data be general propositions, or particular observations and perceptions," (p. 9.) As if aware that a science restricted to "*inferences* from truths *previously known*" —from " *antecedent data*"—would scarcely suit his purpose, he enlarges its boundaries, once more, in his final definition ;— " Logic, then, is the science of the operations of the understanding which are subservient to the estimation of evidence ; both the process itself of proceeding from known truths to unknown, and all intellectual operations auxiliary to this," (p. 13.)

Now, we must demur against any definition of Logic which represents it as " *the process itself* of proceeding from known

truths to *unknown.*" This author admits that reasoning or inference is *the* business of Logic. He distinctly states this in laying down the chief object of his elaborate work ; "our object," he says, " will be to attempt a correct analysis of the intellectual process called Reasoning or Inference, and of such other mental operations as are intended to facilitate this : as well as, on the foundation of this analysis, and *pari passu* with it, to bring together or frame a set of rules or canons for testing the sufficiency of any given evidence to prove any given proposition," (pp. 13, 14.) But, strictly speaking, Reasoning, or Inference *alone*, can never lead us to *unknown* truths. Truths absolutely unknown, not *implied* in anything we previously knew, which cannot be *inferred* from anything already in our possession, can only be obtained by *information*, whether received from the testimony of our senses, from the report of credible narrators, from observation, experience, or any of the numerous methods by which we acquire knowledge. An able man, if allowed sufficient time and opportunity, might, by pure patient Reasoning, attain to any amount of mathematical knowledge, because all the truths of mathematics are implied and involved in the definitions and axioms of that science. But no amount of ability or toil could give him the knowledge, by Reasoning *alone*, of what took place in his absence ; of matters of fact not previously known ; of truths to him absolutely *new.* He could never tell, by any effort of mere reasoning, how many satellites Jupiter has ; whether Saturn has a ring ; or in what portion of the heavens the constellations Aries, Gemini, or Leo, are to be found. Unless he had either seen or been informed of the experiments, he could never discover, by Reasoning alone, what effect would be produced on his eye by mixing the colours yellow and blue ; or what would be the appearance of a ray of light when passed through a prism. New truths are not generally ascertained *without* Reasoning ; but this is not the *whole,* nor the *chief part,* of the process which is necessary to their acquisition. To represent Logic, —which treats not of *every* exercise of Reason, but of Reason*ing*—" the inferring from certain granted propositions another proposition as the consequence of them,"—as an instrument of discovery, is to mistake or misstate the nature of the science. There are, it is true, what are called *Logical Discoveries,* truths

which have been *overlooked* by the person who has in his
possession the premises from which they may be elicited by
Reasoning, and which truths may be as much hid from him,
for all practical purposes, till thus developed, as if they had
been absolutely unknown. But these are not the *unknown*
truths to which our author refers when he defines Logic, " the
process itself of proceeding from known truths to unknown."
He maintains that " cases of inference, in the proper accepta-
tion of the term," are " those in which we set out from known
truths, to arrive at others really distinct from them," (pp. 222,
223 :) and " that the conclusion may, to the person to whom
the syllogism is presented, be actually and *bonâ fide* a new
truth," (p. 246.) This may be necessary if we are to include
within the province of Logic, as this author has done, the pro-
cess of Induction, and " the methods of scientific Investiga-
tion ;" but these we have seen belong not to our science. The
author himself seems to have anticipated that his definition
would be unsatisfactory : he observes, (p. 2,) " the definition
which I am about to offer of the science of Logic, pretends to
nothing more than to be a statement of the question which I
have put to myself, and which this book is an attempt to re-
solve. The reader is at liberty to object to it as a definition
of Logic ; but it is at all events a correct definition of the sub-
ject of these volumes." We have dwelt, the more particularly,
on his definition, and his remarks respecting the province of
Logic, as, of course, these give a direction and a colouring to all
his discussions—more especially to those respecting the nature
and functions of the Syllogism.

On this branch of Logic our author professes to cast new
light, and to extricate us from difficulties in which we are
otherwise necessarily involved. He says : " Reasoning, in the
extended sense in which I use the term, and in which it is
synonymous with Inference, is popularly said to be of two
kinds : reasoning from particulars to generals, and reasoning
from generals to particulars ; the former being called Induc-
tion, the latter Ratiocination or Syllogism," (p. 223.) Again ;
speaking of Reasoning, he says ; " in one of its acceptations, it
means syllogising ; or the mode of inference which may be
called (with sufficient accuracy for the present purpose) con-
cluding from generals to particulars. In another of its senses,

to reason, *is* simply to infer any assertion, from assertions already admitted ; and in this sense, Induction is as much entitled to be called Reasoning as the demonstrations of geometry," (p. 3.)   Now, we would ask, in these two contrasted kinds of reasoning, where lies the difference ?   Does it lie in the *premises ?*   Or in the *inference* drawn from these premises ?   Or in the *mode* of drawing that inference ?   If in the premises, we would . remark, that with their nature or number, the manner in which they are obtained, or the claims which they have to our belief, Logic has nothing to do.   In every argument, whether the premises be generals or particulars, they must be *antecedent data;* and the only business of Logic is to see that the inferences from them be legitimately drawn.   In syllogistic reasoning, the *inference* is that which is *proved* by the premises ; if then, in the above-mentioned instance, " simply to infer any assertion, from assertions already admitted," does not mean to *prove* that assertion, then it is not, properly speaking, reasoning at all.   Our author observes : " Not only *may* we reason from particulars to particulars, without passing through generals, but we perpetually do so reason. All our earliest inferences are of this nature.   From the first dawn of intelligence we draw inferences ; but years elapse before we learn the use of general language.   The child who, having burnt his fingers, avoids to thrust them again into the fire, has reasoned or inferred, though he has never thought of the general maxim, Fire burns.   He knows from memory that he was burnt, and on this evidence believes when he sees a candle, that if he puts his finger into the flame of it, he will be burnt again.   He believes this in every case which happens to arise ; but without looking, in each instance, beyond the present case. He is not generalising ; he is inferring a particular from particulars.   In the same way, also, brutes reason.   There is little or no ground for attributing to any of the lower animals the use of conventional signs, without which, general propositions are impossible.   But these animals profit by experience, and avoid what they have found to cause them pain, in the same manner, though not always with the same skill, as a human creature.   Not only the burnt child, but the burnt dog, dreads the fire," (p. 251.)   Now, we submit, is this a fair, an admissible specimen of *Reasoning* in the sense in which that term

is understood by Logical writers ? Certainly there is an exercise of *Reason* in these instances ; but is there *Argumentation ?* Both the burnt child and the burnt dog have learned from the testimony of the senses that fire burns ; they believe this, and remember this ; and, therefore, taught by experience, they avoid danger for the future. But here there is no *proving* a conclusion from premises, either general or particular. The testimony of their senses—belief in that testimony—and memory, account for all the phenomena. When I say, " If I touch the fire, I shall be burnt ;" I am not drawing a logical *inference ;* I am merely stating a conditional proposition, which I believe on the testimony of my senses. But " Logic," as this author well remarks, " is not the science of Belief, but the science of Proof, or Evidence. So far forth as belief professes to be founded upon proof, the office of Logic is to supply a test for ascertaining whether or not the belief is well grounded. With the claims which any proposition has to belief on its own intrinsic evidence, that is, without evidence in the proper sense of the word, Logic has nothing to do," (pp. 9, 10.) In so far as the two above-mentioned kinds of reasoning are really processes of argumentation, the difference lies merely, we apprehend, in the mode of *stating* the argument. In the Syllogism the argument is drawn out at full length, and in its regular order ; and then we reason evidently from generals to particulars. Thus : " All men are mortal : John is a man ; therefore, John is mortal." On the other hand, when we seem to reason from particulars to generals, the argument is stated in the form of an Euthymeme, which, for, brevity's sake, is the usual mode of reasoning ; but this is merely a Syllogism with one premise suppressed. For instance ; " John, Thomas, and company are men : therefore, they are mortal ;" here you have only to supply the suppressed premise, without which the reasoning is inconclusive, and the argument is a regular Syllogism.

It will be felt, we dare say, that our author's expressions, " reasoning from particulars to generals, and from generals to particulars," are distinguished neither by precision, nor perspicuity. This he frankly admits ; and, in explanation, observes :—" The meaning intended by these expressions is, that Induction is inferring a proposition from propositions *less general* than itself, and Ratiocination is inferring a pro-

position from propositions *equally* or *more* general. When, from the observation of a number of individual instances, we ascend to a general proposition, or when, by combining a number of general propositions, we conclude from them another proposition still more general, the process, which is substantially the same in both instances, is called Induction," (p. 223.) But, in this statement we have, in both instances, evidently, *two* distinct processes : first, " the *observation* of a number of individual instances"—that is, collecting and investigating them, to see whether or not they suit our purpose ; and then, secondly, *inferring* from them, as premises, such a conclusion as they may warrant us to draw. So in the other case, we first " *combine* a number of general propositions "—that is, bring in, one by one, a number of instances bearing on the point in question ; and then, secondly, we " *conclude* from them another proposition," such as the premises thus obtained will allow. Now, in each of these cases, it is unquestionably the *latter* process *only* that can, in the logical sense of the term, be called *Reasoning ;* and this can be syllogistically expressed as well as any other argument. So far as Induction is an *argument*, it is a syllogism with the major premise suppressed. This our author himself acknowledges :—" Every induction may be thrown into the form of a syllogism, by supplying a major premise," (p. 372.) To distinguish *this* process, then, from Ratiocination or Syllogism, is surely a distinction without a difference. The *other* process, exemplified above, being the *bringing* in, and the *investigation* of facts, is very properly called Induction ; but this is not a process of *argumentation*. It is a process of *inquiry* with a view to obtain the premises of the argument ;—to compare, or contrast it, then, with the Syllogism, is inadmissible. They are mental operations quite distinct in their nature and object ; each, in its own sphere, is necessary and important ; the one cannot be substituted for, or do the work of, the other ; but into their relative merits we are not here called upon to enter. By the one process, we come by our premises ; by the other, we draw inferences legitimately from these premises. Logic takes cognisance of the one ; the other lies beyond its province.

We are anxious to do ample justice to our author's observations on the " Functions, and Logical Value, of the Syllogism ;"

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we shall, therefore, endeavour to state them as fully and fairly as we possibly can. On this point, he says :—"It is universally allowed that a syllogism is vicious if there be anything more in the conclusion than was assumed in the premises. But this is, in fact, to say, that nothing ever was, or can be, proved by syllogism, which was not known, or assumed to be known, before. Is ratiocination, then, not a process of inference? And is the syllogism, to which the word reasoning has so often been represented to be exclusively appropriate, not really entitled to be called reasoning at all? This seems an inevitable consequence of the doctrine, admitted by all writers on the subject, that a syllogism can prove no more than is involved in the premises. Yet the acknowledgment so explicitly made, has not prevented one set of writers from continuing to represent the syllogism as the correct analysis of what the mind actually performs in discovering and proving the larger half of the truths, whether of science or of daily life, which we believe; while those who have avoided this inconsistency, and followed out the general theorem respecting the logical value of the syllogism to its legitimate corollary, have been led to impute uselessness and frivolity to the syllogistic theory itself, on the ground of the *petitio principii* which they allege to be inherent in every syllogism. As I believe both these opinions to be fundamentally erroneous, I must request the attention of the reader to certain considerations, without which, any just appreciation of the true character of the syllogism, and the functions it performs in philosophy, appears to me impossible; but which seem to have been either overlooked, or insufficiently adverted to, both by the defenders of the syllogistic theory, and by its assailants," (pp. 244, 245.)

Since Logicians deny that the functions of the Syllogism is to lead us "a progress from the known to the unknown," he asks, with apparent triumph, "Is ratiocination, then, not a process of inference? Is the syllogism, to which the word reasoning has so often been represented to be exclusively appropriate, not really entitled to be called reasoning at all?" So far from seeing this to be "an inevitable consequence" of the views we hold of the syllogism, we are unable to perceive what bearing these interrogatories have on the subject, in one way or another. A "process of inference," or "reasoning,"

never means, in its logical acceptation, to prove what "was not known, or assumed to be known, before ;" and, therefore, we may safely deny that this is the function of the Syllogism, without being driven to the strange alternative of denying that it is "a process of inference," or "not really entitled to be called reasoning at all." To point out our inconsistency in maintaining that the conclusion of a syllogism must not contain more than is involved in the premises, he charges us with representing "the syllogism as the correct analysis of what the mind actually performs in *discovering*" as well as "proving the larger half of the truths we believe." But, as we do not consider the syllogism an instrument of discovery, and his very charge against us is, *that we do not*, our inconsistency, and his argument, must equally vanish.

He proceeds :—" It must be granted, that in every syllogism, considered as an argument to prove the conclusion, there is a *petitio principii*. When we say,—

> All men are mortal :
> Socrates is a man ; therefore,
> Socrates is mortal ;

it is unanswerably urged by the adversaries of the syllogistic theory, that the proposition, Socrates is mortal, is presupposed in the more general assumption, All men are mortal : that we cannot be assured of the mortality of all men, unless we were previously certain of the mortality of every individual man : that if it be still doubtful whether Socrates, or any other individual you choose to name, be mortal or not, the same degree of uncertainty must hang over the assertion, All men are mortal : that the general principle, instead of being given as evidence of the particular case, cannot itself be taken for true without exception, until every shadow of doubt which could affect any case comprised with it, is dispelled by evidence *aliundè;* and then what remains for the syllogism to prove ? that, in short, no reasoning from generals to particulars can, as such, prove anything : since from a general principle you cannot infer any particulars but those which the principle itself assumes as foreknown," (pp. 245, 246.) Now, what is the amount of the objection here ? Is it not, that we must admit our premises ere we are permitted to reason

from them? And does not this hold good with *all* argumenta-́ tion? We must have *data,* or we cannot proceed one step in reasoning. If we take for granted what ought to be proved, or draw an inference which our premises do not warrant, an intelligent opponent will say, "I deny what you *assume ;*" or, "I admit what you say, but I deny that it *proves* your conclusion." There can, therefore, be no progress, in any argument whatever, till the premises be admitted. If *either* of the premises be denied, whether it be one expressed, or one understood, the argument proves nothing. If *both* are admitted, the conclusion, regularly drawn from them, must be admitted likewise. This objection, then, if valid against the syllogism, is equally valid against all reasoning whatever.

But, it will be said, "Is it true, then, that in every act of reasoning, we do but conclude in one form, what the moment before we had stated in another? Are we to understand that such is the final result of the debate? If so, this act of reasoning appears very little deserving of that estimation in which it has been generally held. The great prerogative of intelligent beings (as it has been deemed) grants them this only—to admit in one shape what they had already admitted in another! You save the syllogism by your argument; but what becomes, in this controversy, of poor human reason?" We reply : why confound Human Reason with Reasoning? The noble intellect of man will retain its proud pre-eminence, surely, though *one* of his mental exercises be not erroneously magnified to include them *all.* In gaining greater degrees of intelligence ; in selecting, combining, and arranging facts ; in discriminating, generalising, and recording principles; in short, in *finding middle terms,* and acquiring ability to use them with readiness and effect, he will find abundant employment for all his intellectual energies ; as well as open up for himself a path of indefinite improvement. And why should Reasoning be deprecated because it cannot do everything? To be able to draw our conclusions fairly from our premises, and to know when and why an argument is strong, or weak, or worthless, must surely be of some advantage. Though stript of the vain and lofty pretensions with which false friends have decked her, our science will be neither less interesting nor less useful, when she comes in simplicity and sincerity to fulfil all her

engagements; instead of leaving us, as she does in these cases of vaunted empty profession, in bitter disappointment and disgust.

With this explanation, however, our author does not seem satisfied. He asks, " In the syllogism last referred to, for example, or in any of those which we previously constructed, is it not evident that the conclusion may, to the person to whom the syllogism is presented, be actually, and *bonâ fide*, a new truth? Is it not matter of daily experience that truths previously undreamt of, facts which have not been, and cannot be, directly observed, are arrived at by way of general reasoning?" (p. 246.) We have already admitted that " Logical Discoveries" may be arrived at by reasoning;—the conclusion, though *implied* in the premises, may not have been previously *perceived* by the person, to whom the syllogism is presented; and, therefore, it may be to him, in one sense, a new truth, though not in the sense for which our author pleads. But does he mean to say, that, in the last syllogism referred to, or in any of those he has constructed, or can construct, there is *more* in the conclusion than is contained in the premises? Unless he means to assert this, his questions are irrelevant. Certainly we should like to see, drawn out in regular form, a *valid* argument, in which there is something more in the conclusion than is assumed in the premises. Our author's illustration is this :—" We believe that the Duke of Wellington is mortal. We do not know this by direct observation, since he is not yet dead. If we were asked how, this being the case, we know the duke to be mortal, we should probably answer, Because all men are so. Here, therefore, we arrive at the knowledge of a truth not (as yet) susceptible of observation, by a reasoning which admits of being exhibited in the following syllogism :—

> All men are mortal :
> The Duke of Wellington is a man ; therefore,
> The Duke of Wellington is mortal.

And since a large portion of our knowledge is thus acquired, Logicians have persisted in representing the syllogism as a process of inference or proof; although none of them has cleared up the difficulty which arises from the inconsistency between

that assertion and the principle, that if there be anything in
the conclusion which was not already asserted in the premises,
the argument is vicious," (pp. 246, 247.)   We are rather at a
loss to characterise this quotation,—coming, as it does, from
the pen of so distinguished a writer.   Is this an example of a
"*bonâ fide* new truth ;"—" truths previously undreamt of,—
arrived at by the way of general reasoning ? "   Is this a syllo-
gism in which the conclusion contains *more* than the premises ?
If it is not, what bearing has it on the point at issue ?   True,
we thus " arrive at the knowledge of a truth not (as yet) sus-
ceptible of *observation;* " but we do so, because the premises
involve this truth by *implication.*   If we admit that all men
are mortal, and that the duke is a man, we only assert in the
conclusion what was assumed in the premises ; hence the use
of the *illative* conjunction—*therefore* the Duke of Wellington
is mortal.   Thus it is with *all* Reasoning ; it merely unfolds
what is already wrapt up in our previous knowledge, but
which is often as much hid from us, for all practical purposes,
till thus developed, as if it had been absolutely unknown.

   This distinction, however, is rejected as worthless.   " It is
impossible," he says, " to attach any serious scientific value to
such a mere salvo, as the distinction drawn between being
involved *by implication* in the premises, and being directly
asserted in them.   When Archbishop Whately, for example,
says, that the object of reasoning is ' merely to expand and
unfold the assertions wrapt up, as it were, and implied in those
with which we set out, and to. bring a person to perceive and
acknowledge the full force of that which he has admitted,' he
does not, I think, meet the real difficulty requiring to be ex-
plained—namely, how it happens that a science, like geometry,
can be all ' wrapt up' in a few definitions and axioms.   Nor
does this defence of the syllogism differ much from what its
assailants urge against it as an accusation, when they charge it
with being of no use except to those who seek to press the
consequences of an admission into which a man has been en-
trapped without having considered and understood its full
force.   When you admitted the major premise, you asserted
the conclusion ; but, says Archbishop Whately, you asserted it
by implication merely ; this, however, can here only mean
that you asserted it unconsciously ; that you did not know

you were asserting it; but, if so, the difficulty revives in this shape—Ought you not to have known? Were you warranted in asserting the general proposition without having satisfied yourself of the truth of everything which it fairly includes? And if not, what then is the syllogistic art but a contrivance for catching you in a trap, and holding you fast in it?" (pp. 247, 248.)   We reply: True, the person *ought* to have known that what he admits *implies* the point in question; and it is the special business of Logic to make him see and acknowledge this.   Nor is this to be considered a trifling or sinister employment.   To remind a man of what he had not thought of is often as practically important as to put him in possession of truths absolutely new.   Inattention, indifference, passion, prejudice, and a host of evil influences, may so bias and blind him that he may overlook the import and application of admitted truths most intimately connected with his best interests.   He who convinces him of his error, and recalls him to his duty, far from "catching him in a trap," will be his true delivery.   Logic may be perverted, no doubt, as every good thing may; but to represent it as "solemn trifling," because it only leads us to make use of the knowledge we already possess, betrays singular forgetfulness.   Is not this the important duty of the mathematician, the moralist, the divine?   Their chief business is to point out what we have *already* admitted, and to induce us to act accordingly. So is it, in so far as mere reasoning is concerned, with the Logician.

But we must hasten to give this author's method of extricating the syllogism from all difficulty and disgrace.   He proceeds:—" From this difficulty there appears to be but one issue.   The proposition that the Duke of Wellington is mortal, is evidently an inference; it is got at as a conclusion from something else; but do we, in reality, conclude it from the proposition, All men are mortal?   I answer, No.

"The error committed is, I conceive, that of overlooking the distinction between the two parts of the process of philosophising—the inferring part, and the registering part; and ascribing to the latter the functions of the former.   The mistake is that of referring a man to his own notes for the origin of his knowledge.   If a man is asked a question, and is at the

moment unable to answer it, he may refresh his memory by turning to a memorandum which he carries about with him. But if he were asked, how the fact came to his knowledge, he would scarcely answer, because it was set down in his note-book: unless the book was written, like the Koran, with a quill from the wing of the angel Gabriel.

" Assuming that the proposition, the Duke of Wellington is mortal, is immediately an inference from the proposition, All men are mortal; whence do we derive our knowledge of that general truth?   No supernatural aid being supposed, the answer must be, By observation.   Now, all which man can observe are individual cases.   From these all general truths must be drawn, and into these they may be again resolved : for a general truth is but an aggregate of particular truths; a comprehensive expression, by which an indefinite number of individual facts are affirmed or denied at once.   But a general proposition is not merely a compendious form for recording and preserving in the memory a number of particular facts, all of which have been observed.   Generalisation is not a pro-cess of mere naming, it is also a process of inference.   From instances which we have observed, we feel warranted in con-cluding, that what we found true in those instances, holds in all similar ones, past, present, and future, however numerous they may be.   We then, by that valuable contrivance of lan-guage which enables us to speak of many as if they were one, record all that we have observed, together with all that we infer from our observations, in one concise expression; and have thus only one proposition, instead of an endless number, to remember or to communicate.   The results of many obser-vations and inferences, and instructions for making innumer-able inferences in unforeseen cases, are compressed into one short sentence.

" When,.therefore, we conclude from the death of John and Thomas, and every other person we ever heard of, in whose case the experiment had been fairly tried, that the Duke of Wellington is mortal like the rest, we may indeed pass through the generalisation, All men are mortal, as an intermediate stage; but it is not in the latter half of the process, the descent from all men to the Duke of Wellington, that the *inference* resides. The inference is finished when we have asserted that all men

are mortal.   What remains to be performed afterwards is merely deciphering our own notes.

" Archbishop Whately has contended, that syllogising or reasoning from generals to particulars, is not, agreeably to the vulgar idea, a peculiar *mode* of reasoning, but the philosophical analysis of *the* mode in which all men reason, and must do so if they reason at all.   With the deference due to so high an authority, I cannot help thinking that the vulgar notion is, in this case, the more correct.   If, from our experience of John, Thomas, &c., who once were living, but are now dead, we are entitled to conclude that all human beings are mortal, we might surely without any logical inconsequence have concluded at once from these instances, that the Duke of Wellington is mortal.   The mortality of John, Thomas, and company is, after all, the whole evidence we have for the mortality of the Duke of Wellington.   Not one iota is added to the proof by interpolating a general proposition.   Since the individual cases are all the evidence we can possess, evidence which no logical form into which we choose to throw it can make greater than it is ;·' and since that evidence is either sufficient in itself, or, if insufficient for one purpose, cannot be sufficient for the other ; I am unable to see why we should be forbidden to take the shortest cut from these sufficient premises to the conclusion, and constrained to travel the ' high *priori* road,' by the arbitrary fiat of logicians.   I cannot perceive why it should be impossible to journey from one place to another unless we ' march up a hill, and then march down again.'   It may be the safest road, and there may be a resting-place at the top of the hill, affording a commanding view of the surrounding country; but for the mere purpose of arriving at our journey's end, our taking that road is perfectly optional ; it is a question of time, trouble, and danger," (pp. 248–51.)

The originality of these views, and our great anxiety to give as full a development of them as possible, must be our apology for these lengthened quotations.   Still we feel, that unless the author's very able disquisitions be read as a whole, in their connexion, with all their varied illustrations, complete justice can scarcely be awarded him.   We, therefore, earnestly recommend a careful study of the volumes themselves.   He sums up his discussion of the syllogism as follows :—" From the considera-

tions now adduced, the following conclusions seem to be established:—All reasoning is from particulars to particulars : General propositions are merely registers of such inferences already made, and short formulæ for making more : The major premise of a syllogism, consequently, is a formula of this description : and the conclusion is not an inference drawn *from* the formula, but an inference drawn *according to* the formula ; the real logical antecedent, or premises, being the particular facts from which the general proposition was collected by induction. Those facts, and the individual instances which supplied them, may have been forgotten ; but a record remains, not, indeed, descriptive of the facts themselves, but shewing how these cases may be distinguished respecting which the facts, when known, were considered to warrant a given inference. According to the indications of this record, we draw our conclusion ; which is to all intents and purposes, a conclusion from the forgotten facts. For this it is essential that we should read the record correctly, and the rules of the syllogism are a set of precautions to insure our doing so," (p. 259.)

" In the above observations it has, I think, been clearly shewn, that, although there is always a process of reasoning or inference where a syllogism is used, the syllogism is not a correct analysis of that process of reasoning or inference ; which is, on the contrary, (when not a mere inference from testimony,) an inference from particulars to particulars ; authorised by a previous inference from particulars to generals, and substantially the same with it ; of the nature, therefore, of Induction. But, while these conclusions appear to me undeniable, I must yet enter a protest, as strong as that of Archbishop Whately himself, against the doctrine that the syllogistic art is useless for the purpose of reasoning. The reasoning lies in the act of generalisation, not in interpreting the record of that act ; but the syllogistic form is an indispensable collateral security for the correctness of the generalisation itself," (pp. 263, 264.)

This theory, although thought out with so much originality and tact, must, we fear, be pronounced more specious than satisfactory ;—at least, in so far as the nature and functions of the syllogism are concerned. It contains, certainly, an able inquiry into " the origin of our knowledge ; " it points out how we attain to " general truths ; " it shews how, by abstraction

and generalisation, we can form, for our convenience and use, common terms, and "general propositions;" and were the inquiry, How are our premises obtained? there might not be much stated in this theory that is objectionable. But, with regard to the *reasoning process*, it is far otherwise. The speculations are ingenious; but, we apprehend they will not work any great deliverance,* either for the friends or the foes of the syllogism. In these extracts, we find the same mistiness and misconception respecting the most common logical terms, on which we have had occasion already to animadvert. The statements are far too fanciful, to be philosophical. What, for example, are we to understand by *inference*, in the following sentences?—" that the Duke of Wellington is mortal, is evidently an *inference;*"—" it is not in the latter half of the process, the descent from all men to the Duke of Wellington, that the *inference* resides;"—" the inference is *finished* when we have *asserted* that all men are mortal." How can the *assertion* that all men are mortal, conclude anything respecting the duke, in distinction from all the rest of mankind,—it being his case only that is under consideration,—unless there be a *special* inference drawn in his case, a "descent from all men" to him in particular? In concluding that the duke is mortal, like the rest of mankind, he admits, "we *may* pass through the generalisation, All men are mortal, as an intermediate stage;"—but we *must* do it, or no logical inference can be legitimately drawn. He says, "the individual cases are all the evidence

* In a very favourable review of Mr Mill's elaborate work, the writer, referring to the above-mentioned view of the syllogism, says, "By this explanation we are released from the dilemma into which the syllogistic and non-syllogistic party had together thrown us;" and, therefore, he adds, we "are grateful for the deliverance it works for us." Yet, this writer's logical studies have either been so defective, or he is so oblivious of them, that he seems not to know, or remember, what is meant by a *minor proposition!* He speaks of it constantly as being the *conclusion.* "Who has not learnt—what is a *major*, what a *middle term*, and what the *minor* or conclusion?"—" We have, or may have, it is true, a *major* in all our ratiocination, implied, if not expressed, and are so far syllogistic; but then the real premise from which we reason is the amount of experience on which that major was founded, to which amount of experience we, in fact, made an addition in our *minor*, or conclusion."—Is this writer a judge competent to pronounce a verdict in this case?

we can possess;"—but, till the induction be complete—till every individual instance, without exception, is included—till, in short, we arrive at the general proposition, "*All* men are mortal," nothing can, with certainty, be concluded respecting the duke's mortality. If *one* exception only be possible, *he* may be that exception; and, therefore, the inference drawn cannot stand. To assume the mortality of any number of individual cases *less* than the whole, would never suffice for the argument; and how can the *whole class* be thought of, or spoken of, without a general proposition? It is not the "arbitrary fiat of logicians," but the necessity of the case, that renders a general proposition indispensable. He says, "the real logical antecedent, or premises, are the *particular facts* from which the general proposition was collected by induction." The "*record*" of these facts is indeed the general proposition. But, if the general proposition be a *correct* record of all these facts, the two must be equivalent; and, if taken in their proper *extension*, it comes to the same thing, whether the one or the other be considered the premises—whether we reason from the facts themselves, or merely "decipher our own notes."

The grand reason why our author is so anxious to get rid of general propositions in reasoning is, that he may divest the major premise of the *petitio principii*. This is the real difficulty; and with much ingenuity does he labour to remove it. "The true reason why we believe that the Duke of Wellington will die," he maintains, "is that his fathers, and our fathers, and all other persons who were contemporary with them, have died. Those facts are the real premises of the reasoning. But we are not led to infer the conclusion from these premises, by the necessity of avoiding any verbal inconsistency. There is no contradiction in supposing that all those persons have died, and that the Duke of Wellington may, notwithstanding, live for ever. But there would be a contradiction if we first, on the ground of these same premises, made a general assertion including and covering the case of the Duke of Wellington, and then refused to stand to it in the individual case," (pp. 262, 263.) But, we ask, if the duke's case is not "included and covered" in the premises, how can we thence conclude anything respecting him? If the duke "may live for ever," for anything the premises say to the contrary, how can we *thus* prove that he is

mortal ? This does get rid of the *petitio principii*, it is true; but it sweeps away the argument likewise.

Again, he says, " In the argument which proves that Socrates is mortal, one indispensable part of the premises will be as follows :—' My father, and my father's father, A, B, C, and an indefinite number of other persons, were mortal ; ' which is only an expression in different words of the observed fact that they have died.   This is the major premise divested of the *petitio principii*, and cut down to as much as is really known by direct evidence," (p. 272.)   We reply : This major premise, " cut down and divested of the *petitio principii*," must either be a universal or a particular proposition.   If *universal*, then, " My father, and my father's father, A, B, C, and an indefinite number of persons," mean *all* mankind ; and, as Socrates is *one* of that number, what is predicated of the *whole* may be of him.   But, alas ! in this case, the *petitio principii* meets us still.   If the above proposition be *particular*—if the " indefinite number " do *not* include all mankind, then the argument is inconclusive.   It merely amounts to this :—

> *Some* men are mortal :
> Socrates is a man ; therefore,
> Socrates is mortal.

In this case the middle term is undistributed ; nothing is proved. To get rid of the *petitio principii* in this way, is surely to emulate Alexander the Great with the Nodus Gordianus.

The novel views propounded in Mr Mill's work, and the high authority with which this author's well-earned reputation has invested his speculations, have detained us thus long in giving them, as our space and ability would allow, a candid examination.   While we have—we trust with becoming deference—recorded our dissent from some things laid down in this work respecting Logic proper, we cheerfully acknowledge there is much more in these highly interesting volumes with which we cordially agree.   It is by no means an elementary work ; yet, after the student has made himself familiar with the elements of Logic, and has made some progress in the study of mental, moral, and natural philosophy, few exercises will be more invigorating to the mind than to give this able production a thorough and oft-repeated perusal.

CHAPTER III.

OF THE POPULAR FORMS OF ARGUMENT.

MUCH misapprehension relative to the practical utility of Logic has sprung from the mistake into which many justly celebrated writers have fallen, that Aristotle meant the syllogistic form of reasoning, expressed in regular figure and mood, to supersede the various forms of reasoning in common use.   This error lies at the foundation of all Locke's objections to the Syllogism.   It is implied in what Campbell, in his "Philosophy of Rhetoric," brings forward, when he affirms "that this form of reasoning is a very incommodious one, and has many disadvantages, but not one advantage of that commonly practised, will be manifest to every one who makes the experiment.   It is at once more indirect, more tedious, and more obscure."   And Lord Kames charges Aristotle with inconsistency, because " in his Treatise of Ethics, Politics, &c., he argues like a rational creature, and never attempts to bring his own system into practice."

A mistake so palpable we should scarcely have thought worthy to be mentioned, had it not been advanced by these distinguished authors, who have thus given it a prevalence and importance which it could not otherwise have obtained. It never was intended that this mode of unfolding arguments should be introduced into general practice, or that all the popular abbreviated forms of stating an argument should be abandoned, in order that the Syllogism, stated at full length, might be universally employed.   This would be as absurd as for a Grammarian to *parse* every sentence he reads.   Who ever dreamt that this was the object which Grammar was intended to accomplish?   And why should a supposition as absurd have been entertained respecting the Science now under consideration?   On this subject it has been well remarked, that "Logic, which is, as it were, the Grammar of Reasoning, does not bring forward the regular syllogism as a distinct mode of argumentation, designed to be substituted for any other mode ; but as the form to which *all* correct reasoning may be ultimately reduced; and which, consequently,

serves the purpose (when we are employing Logic as an *art*) of a test to try the validity of any argument; in the same manner as by chemical analysis we develop and submit to a distinct examination the elements of which any compound body is composed, and are thus enabled to detect any latent sophistication and impurity."

The different forms which reasoning assumes in common practice have been variously classified by Logical and Rhetorical writers. They have divided arguments into regular and irregular; direct and indirect; *a priori* and *a posteriori;* hypothetic and inductive; synthetic and analytic; moral and demonstrative; arguments from example, testimony, analogy; and various other subdivisions which it is not necessary even to specify. Many of these divisions, however, are not divisions of reasoning at all: and many of them are evidently made on very different principles; sometimes according to the form which the arguments assume, sometimes according to their subject-matter, and sometimes according to the purpose for which they are employed; hence they run into and cross each other; and many of the arguments thus specified may be placed in one class or another, according to the view that is taken of them at the moment. To invent and arrange arguments is properly the business of Rhetoric; it may be proper, however, to state some of the *forms* which they assume in common practice; as an acquaintance with these is necessary in order to our being able to apply our scientific knowledge to the best advantage. It will be a useful exercise for the student to take examples of these different forms of argument, and reduce them to the regular syllogistic form, which, it will be found, in so far as they are correct arguments, they can all be made to assume.

The *regular* and *irregular* forms of arguments have been fully developed in the preceding pages. The same may be said also respecting the *direct* mode of arguing, which is merely the simple and obvious method of drawing a conclusion *ostensively*, from admitted premises. The *indirect* method of reasoning is that of drawing a conclusion *indirectly*, by means of some other conclusion which must be admitted as the alternative, if the proper conclusion be denied. Of the *indirect* arguments several kinds are enumerated by Logicians;

as the *argumentum ad hominem*, an appeal to the principles of an opponent ; *argumentum ex concesso*, a proof derived from some truth already admitted ; *argumentum a fortiori*, the proof of a conclusion deduced from that of a less probable supposition that depends upon it ; *argumentum ad judicium*, an appeal to the common sense of mankind ; *argumentum ad verecundiam*, an appeal to our reverence for some respected authority ; *argumentum ad populum*, an appeal to the passions and prejudices of the multitude ; *argumentum ad ignorantiam*, an argument founded on the ignorance of an adversary ; the *reductio ad absurdum*, which is the proof of a conclusion derived from the absurdity of a contrary supposition : and to these might be added various forms of *demonstrations* which are found in the writings of Geometricians. These arguments are called *indirect*, because the conclusion that is established is not the absolute and general one in question, but some other relative and particular conclusion, which the person is bound to admit in order to maintain his consistency. The *reductio ad absurdum* is the form of argument which more particularly comes under this denomination. The *argumentum ad ignorantiam* is evidently nothing more or less than some Fallacy employed to deceive. Indeed, they will all be found, in so far as they are correct arguments, capable of being reduced to the syllogistic form ; and in so far as they are fallacious, their falsity may be detected and exposed, as was pointed out in the preceding pages, when treating of Fallacies.

In reasoning *a priori* we use arguments to prove a *fact* from a given *law*, or an *effect* from an alleged *cause*. In this way the immortality of the soul was attempted to be proved, in a preceding part of this work, when treating of the *Sorites*. In reasoning *a posteriori* we endeavour to prove the existence of an alleged *cause* by reasoning from the *effects* which have been produced. Thus we may argue from the phenomena of nature, and the proofs of wisdom and design in the works of creation, that they must have been produced by an intelligent Creator. In each of these modes the reasoning process is the same ; since it is merely the deducing a conclusion from given premises. The difference lies in the nature of the premises, not in the argumentation. And when treating of the abbre-

viated form which this species of argument generally assumes, we shewed that it was entirely dependent on the laws of the Syllogism.

The various canons and properties of *hypothetic* reasoning have been already fully developed ; and the *inductive* process, in so far as reasoning is concerned, has also been explained. The *synthetic* and *analytic* processes, which are often brought forward as distinct kinds of reasoning, are not properly different forms of arguments, but different methods of investigation. In so far as reasoning enters into these processes, they differ nothing from what has been already developed. The only difference that can be pointed out between them lies merely in the manner in which the process of investigation is carried on. To dwell on them is, therefore, quite unnecessary.

To Moral and Demonstrative Reasoning we shall have occasion to refer more particularly hereafter ; we only notice them at present to shew that they are capable of assuming the syllogistic form. *Moral* reasoning is employed in the establishment of contingent truths, and consists in bringing forward a number of arguments to shew that the matter respecting which the argumentation is carried on, is supported with sufficient evidence to claim our belief, though we cannot shew its *absolute certainty*. Thus when we say, " The man who is industrious and sober will acquire riches," the argument implied in this assertion is called *moral*, or is founded on probability ; because we know that industry generally meets with encouragement, and enables a man to acquire wealth ; that sobriety prevents him from needlessly spending it ; and that the accumulated earnings of many years will at last increase to a considerable sum of money. But this does not amount to an absolute certainty ; for though industrious, a man may not be able to get sufficient employment, or employment of such a kind as will enable him to acquire riches ; or, if they are acquired, he may be deprived of them by ten thousand accidents, which he can neither foresee nor prevent. This mode of arguing, however, in so far as the process of reasoning is concerned, was fully explained when treating of hypothetical syllogisms. *Demonstrative* reasoning is used in proving *necessary* truths. This form of reasoning produces belief imme-

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diately, as soon as the terms are understood in which it is ex-
pressed. It differs from probable or moral reasoning, as there
is always a possibility of the latter being fallacious, which
cannot be the case in the former, since a demonstration proved
by one argument is as firmly believed as if it were proved by
twenty. In probable reasoning, however, the strength of
evidence very often increases with the number of the argu-
ments. The proper province of demonstrative reasoning is
the mathematics; and that it is capable of being moulded
into the syllogistic form, admits of no question. Even the
enemies of the logical system have been obliged to admit this.
Dr Campbell, when endeavouring to reprobate Logic as cap-
able only of sheltering fallacies under the awkward verbosity
of this artificial system, acknowledges what we now have
advanced. "I am satisfied," he says, "that mathematical
demonstration is capable of being moulded into the syllo-
gistic form, having made the trial with success on some pro-
positions."

Such are the various forms of argument which are employed
in common practice. They are all useful and necessary, and
the person who would propose to abandon them, and intro-
duce on all occasions the syllogism, expressed in due form, in
mood and figure, would be a fit object for pity or ridicule.
This is not the intention of Logic. The examples given in
the development of the syllogistic system are necessarily made
to assume the form of the regular syllogism, since it is the
object of the science to shew that all reasoning may be re-
duced to that form, and depends for its validity on the laws
there laid down. From this, perhaps, the absurd idea may
have arisen, that this mode of stating an argument was
intended to supplant all others. Nothing could be more
unfounded. These different forms may all be retained, and
employed as may best suit the object of the reasoner, or the
nature of his subject. All that Logic proposes to effect is, to
unfold the principles on which the reasoning, in all these
cases, depends—to explain its nature and laws,—and to aid
our practical ability in conducting an argument by the im-
partation of scientific knowledge.

As, however, it is only to arguments when exhibited in
their bare elementary form that the rules of Logic apply, it

will be necessary, when these arguments are found in a popular form, to reduce them to the form of the syllogism, before the test of logical principles can be with advantage applied to them.   The student, therefore, would do well to accustom himself to this method of analysing and reducing popular arguments.   Enough has already been laid down, in what has preceded, to aid him in so doing, both by precept and example.   It is not necessary, however, that he should confine himself, in thus applying the rules of Logic, to mere isolated arguments.   He may examine paragraphs, or sections, or even whole books of an argumentative character, and test the entire chain of reasoning to whatever length it may be drawn out.   In this case, in order to gain his object effectually, he must begin with the last point proved, whether it be formally enunciated or not; and, tracing the reasoning backward, he must ascertain on what this assertion is founded.   The assertion will then be the conclusion, and the ground on which it rests will be the premises; the whole may then be expressed in the syllogistic form, and be tried by the rules of Logic.   The premises must then be taken separately, and with each of them the same course must be pursued, as with the former conclusion.   The proof on which they rest must thus be carefully examined and tried; and the process must be repeated till the whole train of argument, to whatever length it may extend, has been examined and decided on.   This is all that Logic pretends or purposes to do; and to represent it as either able or intended to do more, is to misrepresent the Science.   As this method of logical analysis is so intimately connected with the application of Logic to practice, we shall give in an Appendix a more lengthened detail and example of the right mode of conducting it.

CHAPTER IV.

OF THE NATURE AND LAWS OF EVIDENCE.

ALL Reasoning supposes that there are certain principles in which mankind acquiesce, and which they admit as sufficient to establish, beyond all reasonable doubt, the opinions to which they yield their assent. Were this not the case, we should have no *data* on which to proceed in argumentation, and no criterion to which we could appeal, in any case that was doubtful to ourselves, or disputed by others. The attempt to convince another, by any process of reasoning, would, therefore, be an endless and a fruitless labour; because, whatever might be advanced in favour of any disputed point, might itself be questioned as much as the point which it was intended to establish; and thus we should go on for ever, without being able to appeal to any principle that was admitted as requiring no proof, or that was deemed sufficient to command assent, or produce conviction. We must have some *ground* or *reason* for what we believe; our opinions must be founded on something that is more evident than they are themselves; and this ground on which we rest our opinions is called Evidence. As it is necessary in all cases that we judge fairly, according to the nature of the evidence before us, we never can be good reasoners without some knowledge of the principles on which the truth of an opinion or a proposition ought to be decided on. In order, then, that Logic may be applied with propriety and effect to practical purposes, it is necessary that we be acquainted in some degree with the nature, varieties, and laws of evidence.

The methods whereby we gain an acquaintance with the different departments of knowledge are very various; and the evidence that confirms these facts has also been arranged into numerous different classes by those who have written on the subject. Buffier, Beattie, Reid, Campbell, Stewart, and many other eminent authors, have discussed the doctrine of evidence with great ability; and to their works we must refer those who wish to see this important branch of metaphysical and moral science fully discussed; a mere outline is all that can

here be attempted.   These writers have differed somewhat from each other in their classification and arrangement of the sources of evidence; but in the grand principles which are laid down and developed they in a great measure agree.   The simplest classification is that founded on the manner in which our assent is commanded, or our judgments formed.   In some cases we immediately yield our assent to a proposition as soon as the terms in which it is expressed are understood.   In other cases, our decisions are formed in consequence of a process of thought consisting of different successive steps.   This method of classification arranges all evidence into two great divisions, *Intuitive* and *Deductive*—the nature and properties of which we must shortly notice.

Under Intuitive Evidence is ranked that which is derived from *mathematical and physical axioms*.   Of this kind is the evidence attending propositions like these,—one and four make five—things equal to the same are equal to one another —a whole is greater than its parts—a body cannot be in two places at the same time; and, in short, all axioms in arithmetic and geometry.   All such propositions have an original and intrinsic evidence, which makes them, as soon as the terms in which they are couched are understood, intuitively believed.   If they are not thus admitted at once, no deduction of reason, nor process of argumentation, will ever make their truth more apparent, or give them any additional evidence.   All axioms of this kind are founded on some certain first principles, which we are so formed as necessarily to admit as true and undeniable, as soon as they are presented to the mind.

To this head, also, is assigned the evidence derived from the *report of our senses*.   It is in this way we obtain our knowledge of external objects, and the conviction that they really are what they appear to be.   When we see a man, or touch a table, or taste an orange, we are irresistibly led to believe that these objects exist, and that they have size, shape, colour, and the various qualities which our senses inform us they possess.   We have a perfect certainty of the reality of the sensations which we experience in these instances.   Our senses furnish us with evidence of the existence of everything which thus comes within the sphere of our sensations; and to

this evidence we are induced at once to give credit, without having recourse to any reasoning process to confirm its dictates. Sometimes, it is true, the apparent evidence of our senses is not correct, and not to be trusted. But in these cases the organs are not in a healthy state ; or the objects are not rightly situated ; or the medium is not suitable or in its proper state ; hence the evidence is vitiated. But, even in these cases, we yield an assent to what our senses *appear* to declare ; and so certain is our belief in the testimony which they give, that, unless the testimony of one sense corrected the apparent evidence of another, we should often be led astray.

The evidence of *consciousness* belongs also to this class. By this means we have a perfect assurance of our own existence. We know that we exist, and that we are the subjects of all that is passing in our minds. We are convinced, by evidence the most irresistible, that we think, and reason, and remember, and feel, and perform all the functions of life. The evidence derived from consciousness is so undeniable, that it has never been questioned even by the most sceptical. This evidence is absolutely essential, since without it we never should be able to carry on the common business of life ; and, although the judgments thus formed cannot be moulded, as axioms are, into general positions, to which a chain of reasoning may be applied, yet they are quite as conclusive and convincing as any axiom.

Another branch of intuitive evidence arises from what has been called *common sense*. This is a source of knowledge common to all mankind : it is possessed in different degrees by different persons, but none are totally destitute of it, except those who are not in the possession of their faculties. It is in this way we derive our conviction of the truth of propositions like these,—whatever had a beginning had a cause —when there is contrivance and skill perceived in an effect, there must have been an intelligent cause—the course of nature will be the same to-morrow as it has been to-day ; all propositions of this kind, the constitution of our mind compels us to believe, without any external proof. The evidence of common sense, being a natural dictate of the mind, is also as firmly believed as any mathematical axiom.

The evidence of *memory* is another branch of intuitive evidence. When events which have previously happened are recalled to the mind, we are so constituted as to give implicit confidence to what memory reports respecting them. We are convinced that the events happened, and that that which is impressed on the mind respecting them is positively certain. Remembrance, it is true, is not always accompanied with this absolute conviction : since the facts which are recorded on memory are in many cases very soon partially effaced or obliterated ; or, if they remain, from various causes, they may be confounded with other events, or perhaps with the mere figments of our imagination. But, if we distinctly remember any past event, we are absolutely certain that it took place, and can no more doubt respecting it, than we can doubt the testimony of our senses. It is not possible to draw the line correctly between those impressions on the memory which command instant belief, and those which are so imperfectly remembered as merely to justify supposition or opinion ; nor is this at all necessary, since the mind itself will afford, in most cases, all that is needed to regulate our decisions and conduct. But, whenever the truths which are called up in the mind are clearly and distinctly recognised, we implicitly rely on the evidence which memory thus affords. And experience will materially aid us in those cases in which we are doubtful whether what appears to be the intimations of memory are really so or not.

These are the principal classes into which *intuitive evidence* has been divided. It includes everything the evidence of which results from the mere simple contemplation of the object, and which requires no medium to confirm its truth, but the evidence which the object itself carries along with it. The classification adopted respecting the various kinds of evidence included under this head, is not perhaps perfect, or in every case uniform ; as some writers prefer one division, others another ; but the distinguishing characteristics by which it may be known are these : the belief attending it is instantaneous, irresistible, and universal ;—wherever there is room for comparison, or any necessity for reasoning, this evidence is wanting. If, then, in any process of argumentation, an appeal is made to the evidence thus obtained, the appeal is final. The

decisions thus formed are first principles beyond which we cannot advance; and which never can be made more evident by any additional evidence or argumentation.   The various attempts which learned men have made to prove that which evidently lies beyond their power to demonstrate, have only exposed them and their efforts to ridicule.   First principles are the *ne-plus-ultra* in reasoning.   These we must admit as self-evident, without being able to assign any reason for believing them, except that we are so formed as necessarily to admit them.   The man that denies them is irrational, and ought not to be argued with, but commiserated.

On the other hand, Deductive Evidence is that to which we yield our assent, because we are satisfied with the proof which has been brought forward to confirm it.   This branch of evidence has been divided into two principal divisions—*Demonstrative* and *Moral.*   The former rests either on axioms, that is, self-evident truths which we receive intuitively on their own naked authority, or on propositions which have already been proved.   To this the name *scientific* has been given, because science is built on this kind of evidence.   But *moral* evidence respects truths that are contingent, and is founded on what has been called moral axioms, or the principles we derive from consciousness, common sense, and experience.   It proceeds on the presumption that those principles which guide us in life are to be depended upon.   It, however, admits of degrees, and may be weakened or overthrown by contrary evidence.   To this the name of *probable* has therefore, been given.   The nature of both these kinds of evidence, their properties, and varieties, must shortly be considered.

Demonstration has for its object abstract, independent truth. The propositions with which this kind of evidence is conversant, are not limited to time or place; have no necessary dependence on any existing state of things, or matters of fact; their truth lies not in conformity to the nature of things, but in conformity to themselves, or to the hypothesis which have been formed respecting them.   Hence their truth is necessary and eternal.   They are not only true, but it is impossible they can be false.   Every assertion opposite to truths of this kind is not only false, but absurd.   Thus the assertions,—the whole is greater than any of its parts—if equals be taken from

equals the remainders will be equal—all the angles of a tri-
angle are equal to two right angles—circles are to each other
as the squares of their diameters,—must ever remain immu-
table truths ; and they would be so were there nothing in
nature to which they as definitions could be applied.   But,
were the opposite to be affirmed,—the whole is *not* greater
than any of its parts—if equals be taken from equals the re-
mainders will be *un*equal—all the angles of a triangle are
not equal to two right angles—circles are *not* to each other as
the squares of their diameters,—these assertions would not only
be false, but absurd, inconceivable, and self-contradictory.
This does not hold, however, in *Moral* evidence. It is conver-
sant with *matters of fact*, that is, the various, changeable, con-
tingent, though real connexions that take place among things
actually existing.   These matters of fact can never be proved
by demonstration ; but they may be established in such a
manner as to leave no more doubt on the mind respecting
them, than there is respecting a truth that has been mathe-
matically demonstrated.   I have no more doubt that I was
present in such and such a place, at such and such a time,
than I have that " the cube of two is the half of sixteen ; " or
that " all the angles of a triangle are equal to two right angles."
But the *kind* of certainty I have of these different truths is
very different ; for mathematical propositions are not true in
the same sense as matters of fact.   To deny truths founded on
moral evidence implies no absurdity or contradiction.   Were a
person to say that I was *not* present in such and such a place,
at such and such a time, though the assertion might be
false, the *contrary* of it is neither absurd, inconceivable, nor
self-contradictory ; but it would be so were any person to deny
the truth, or affirm the contrary, of the above mathematical
propositions.

  In demonstration the evidence is perfect, or it is no evidence
at all.   Eternal and necessary truths do not admit of degrees.
But it is not so in moral evidence.   This relates to actual
truth, or matter of fact, in reference to which probability is
often the highest point we can reach.   It admits, therefore, of
degrees, from mere probability, to absolute moral certainty.
In almost every case in which moral evidence is employed,
there are contrary evidence to be balanced, and the evidence

on the one side may weaken or overthrow the evidence on the other. But this cannot take place in demonstration. Here contraries can have no place. If a demonstration can be refuted, it must be by another demonstration; and to suppose that this can happen, is to suppose that contraries can be demonstrated, or that the same proposition can be both true and false. Demonstrative evidence, then, is, in many respects, very superior to moral. It is simple, consecutive, conclusive. But its sphere is limited; it is not, therefore, by any means so useful in the affairs of life, as the more complicated, disjointed, and often doubtful evidence of a moral kind, which can be applied to almost everything that comes within the compass of human knowledge, and particularly to everything that comes home to our business and bosoms. Although, then, less dignified than demonstrative evidence, moral evidence is more useful; and, therefore, merits particular attention. It has been distributed into three classes, that of Experience, Analogy, and Testimony.

The evidence of *Experience* results from our observation of the present, and our remembrance of the past. When we have observed a number of events of the same kind to happen uniformly in the same circumstances, we are induced to believe that these events will always happen in similar circumstances. This evidence is deductive; consequently it depends on the number of the antecedents and consequents. If the facts on which it is founded be sufficiently numerous, and are not confronted with any contrary experience, the conclusion is morally certain, and we may be assured that the fact thus deduced is true. Thus we are sure that the sun will rise to-morrow—that the seasons will succeed each other in their regular order—that fire will burn—iron sink, and deal float, because these conclusions are built on a full and uniform experience. But, when this full, uniform, and constant experience has not taken place, our judgments cannot amount to moral certainty, but only to some degree of probability. Thus, it is perhaps probable that, in the last week of April, a storm will pass over Calcutta; because we know that storms frequently happen at that season in Bengal. That at some time or other, during that same month, it will rain in any specified part of Bengal is *more* probable; because this, in almost every year, is the

case. Still it is not certain, because the experience is not uniform. That it will rain during the month of June in Bengal, may be pronounced certain ; because this has been found to be the case almost without exception. If, then, constant experience has convinced us that certain events have, in certain circumstances, uniformly occurred, we are justified in expecting the same in like circumstances again. The uniformity of the laws of nature renders this sort of evidence sufficient to command full assent. Experiment also may be brought in to confirm its testimony; because the more we become acquainted with elementary natures, the more we are convinced, by a general experience, that their operations are uniform and invariable. This species of evidence is of vast importance, as it is the foundation and criterion of almost all moral reasoning.

Another branch of moral evidence is that derived from *Analogy*, which is nothing more or less than a mere indirect experience, founded on some similitude existing between things that are compared together, and which we have ascertained by means of observation or experiment. We are thus induced to believe that similar causes will produce similar effects ; and, from our knowledge of certain properties in objects which are known, are led to infer that similar properties exist in other objects which are unknown, or but imperfectly discovered. Thus, we may conclude from analogy that the planets are or will be inhabited ; because we have reason to believe they are worlds like our own—enlightened by the same sun—subject to the same laws—undergoing similar revolutions—and enjoying the same vicissitudes of season: and, as every part of nature with which we are acquainted teems with inhabitants, we have good grounds for supposing that the orbs which illuminate the vault of heaven are also inhabited. The evidence in this case, however, is much weaker than that of direct experience, because it is founded only on its resemblance to that which experience teaches us does exist. It, therefore, amounts only to *conjecture*, while the other reaches to absolute certainty. The evidence of analogy rests on the number and certainty of the degrees of resemblance, and hence it is weakened in proportion to the remoteness of the resemblance between the objects compared. When a subject admits of no other kind of proof, this species

of evidence may be with propriety and advantage adopted. Its legitimate province, however, is rather to silence objections than to establish truth ; and with what effect it may be used for this purpose by a skilful hand, may be seen by consulting "Butler's Analogy of Religion, Natural and Revealed," in which the objections of sceptics against Christianity are so triumphantly refuted.

The third grand division of moral evidence is that of *Testimony*. Testimony is a statement given by another respecting something with which he is supposed to be acquainted. By this means we become informed respecting facts which lie not within the sphere of our own observation ; and when the conditions are fulfilled which are necessary to make the deposition of others credible, we are led as firmly to believe this evidence as we do the evidence of our own experience. The confidence we repose in this species of evidence springs from the conviction we naturally have of human veracity, or of the veracity of the witness who, in any particular instance, bears testimony to a fact. It is not founded in our own individual experience, because the evidence thus afforded is often stronger than any we can attain by mere experience. It embraces the experience of others as well as of our own ; and to it we are indebted for by far the greater portion of our most valuable knowledge. This testimony may be either oral or written. And although, in some instances, human testimony is weak, and little to be depended on, it may nevertheless reach to absolute certainty. It requires, however, to be properly guarded ; and the circumstances must be carefully observed which tend to corroborate or invalidate its evidence. The credit given to oral testimony depends much on the character, condition, and circumstances of the witness ; and the credit given to written testimony depends, among other things, principally on the opportunity which the writer had of becoming sufficiently acquainted with what he relates. When the testimony of any one is confirmed by a number of concurrent, independent, and creditable testimonies, the truth of the fact is established beyond all reasonable doubt.

In examining the validity of human testimony, we should inquire whether the witness is, or is not, himself deceived. If he is competent properly to understand the subject respect-

ing which he speaks—if he has seriously applied himself to its examination—if his mind be free from those passions and biases which warp the judgment, then we may reasonably conclude that he is not imposed on himself, and, therefore, that his testimony, so far, is worthy of credit.   Another point to be ascertained is, whether or not the witness has any intention to deceive others.   In order to ascertain this we must consider whether his general character is such as to warrant confidence—whether he is likely to have any private ends to serve, in this particular instance, which might induce him to practise deception—or whether his testimony is likely to turn to his disadvantage, for men will seldom attempt to impose on others without having some intention of thereby bettering themselves.   Hence a man's testimony may generally be depended on, if it is given at the risk, or actual loss, of any worldly advantage.   Concurrent testimony, where there has been no previous concert, will here render valuable assistance. If the witness be neither deceived himself, nor have any intention of deceiving others, we must still further inquire, whether he has clearly and correctly given his testimony, and whether we have rightly understood his meaning ; because, neither the one party nor the other may have properly attended to the terms employed ; and thus, through mere inattention and carelessness, both may go astray.   When, however, the witnesses are intellectually and morally competent to give evidence—when their number is sufficient—their testimony clearly expressed—and we have correctly apprehended the import of the testimony given, the evidence thus derived is as convincing as demonstration.

Such then is a brief outline of the various kinds of evidence, both intuitive and deductive, which may be employed in judging of the truth or falsity of propositions.   By attending to these particulars we may be materially aided in the assumption of premises, or in acquiring the *matter* of which our reasoning must be composed.   The observations which writers on this subject have laid down may be highly serviceable in reference to the application of Logic ; but they are of course comparatively vague and general, and cannot be reduced to any strict theory, like that which the reasoning process has been made to assume.   Much in this matter must

of necessity be left to the natural good sense, shrewdness, and intelligence of the individual.

CHAPTER V.

OF THE CAUSES OF ERROR IN JUDGING AND REASONING.

IT is of great moment, in all our investigations, not only that we be acquainted with the evidence according to which we ought to judge, but that we bring our mind to the examination of the subject in a fit and proper spirit. Numerous are the impediments which hinder us in our search after truth, and which often render it a most difficult matter to persuade or convince others. The natural perverseness and precipitancy of the human mind, and the numerous preconceived opinions, misconceptions, and prejudices, which have sprung up, and grown with our growth, and strengthened with our strength, present, in many cases, an almost insuperable barrier to conviction and belief. These blind the mind, and pervert the judgment, so that we are easily led to assent to propositions that are false; while we neither perceive the truth of those that are almost self-evident, nor assent to them when proved by incontestible evidence. A few observations, then, on the causes which lead to these most injurious consequences, may neither be out of place, nor destitute of utility.

An *error* is the assent of the mind given to a false proposition. It has its seat in the mind, not in the proposition; hence the cause of the error must be sought for, not in the erroneous statement, but in the *state of the mind,* by which it was laid open to deception and imposition.

Almost all the errors into which mankind fall may be traced either to the *precipitancy* with which their opinions are formed, or to the *prejudices* which they have entertained. Nothing seems to be more irksome to the human mind than a state of doubt and hesitation. It delights to bound from truth to truth, with a rapidity that might have been sustained without

detriment, had it not fallen from its original dignity, and lost much of its primeval capability. But, as our physical strength is impaired by disease, so are our mental energies by spiritual maladies; and, therefore, it is only by patient research, close attention, and slow degrees, that we can with any safety proceed in our acquisition of knowledge. This is a drudgery, however, to which many cannot submit; hence, through the influence sometimes of bodily constitution, or mental imbecility, or mere indifference, or impatience of restraint, or the sudden impulse of some passion or propensity, or the necessity of choosing speedily between conflicting opinions, they hurry over the subject with thoughtless inattention, and easily fall into errors, which consideration would have enabled them to escape.

Prejudice, however, is the most fruitful source of error. By prejudice we understand a judgment prematurely formed, and assented to without sufficient examination or evidence. Now, although we may be prejudiced in favour of the truth, as well as against it, yet, as truth requires no such auxiliary, and as error finds in it a most powerful ally, it would be well were all the prejudices that abound exposed and abandoned, and their places occupied by sound reason and solid proof. Philosophers have, therefore, attempted to classify and describe these diseases of the mind, and to point out their proper remedies. The divisions adopted in doing so are, of course, various; and perhaps it is not possible to devise any general heads under which the whole can be distinctly arranged. The division adopted by Lord Bacon is the best with which we are acquainted. He has denominated the various causes of error, the Idols of the understanding, and arranged them into four classes :—*Idola tribus ; Idola specus ; Idola fori ;* and *Idola theatri.* We shall briefly explain the several members of this division, and illustrate them with examples.

To every false notion of the mind, by which men may be drawn into error, Lord Bacon has given the name *idol.* By this figurative term he elegantly distinguishes false science from true. In true science truth is the only proper divinity, and to this the understanding, when free from prejudice, yields her enlightened homage. But erroneous notions are a species of idols which usurp that homage which the mind ought to render

only to truth. They are, therefore, stigmatised as false deities which ought to be abandoned and destroyed.

Of these causes of error the first class includes the *Idola Tribus*, or the Idols of the Tribe. These have their foundation in human nature itself, without having regard to any modifying circumstances ; and are, therefore, incident to the whole tribe or race of man. The principles that thus lead us astray are highly useful and necessary when properly regulated or applied ; the danger springs entirely from their excess, or defect, or wrong direction. This head Lord Bacon illustrates in a very admirable manner, by shewing how apt we are to reason on a mere assumption ; to regard our preconceived opinions ; to follow our imagination ; to expect too much from our limited capacities ; to trust too implicitly to the testimony of the senses ; and to cherish an undue fondness for generalisation.

In illustration of these particulars, Lord Bacon observes, that the mind has naturally this property, that it supposes a a greater order and uniformity in things than is really the case. Though many things in nature are unique, and many extremely dissimilar, yet the mind is still imagining parallels, correspondencies, and relations, which have no real existence. Hence the fiction of the ancient astronomers, that all the celestial bodies moved in perfect circles ; and that of the ancient chemists, who imagined that there were only *four* principles, corresponding to the heavens, air, earth, and water. In short, all the numerous dreams in which the ancient philosophers so lavishly indulged may be traced to this error. The mistakes in common life which spring from this source are also without number.

With regard to our preconceived opinions, he observes, that when the mind is once pleased with certain things, it draws all others to consent and go along with them. Though the power and number of instances that make for the contrary opinion are greater than those which favour this adopted supposition, yet the mind either does not attend to them, or despises them, or removes, rejects, or explains them away, with a strong and pernicious prejudice to maintain inviolate the authority of its first choice. Hence in cases of superstition, of astrology, dreams, omens, and such like vanities, those who find pleasure in these things, always observe where the event

answers to their predictions; but pass over, or but slightly notice, the instances in which their predictions fail;—which generally, however, are by far the most numerous.

The human intellect is most moved by those things that strike it suddenly, enter in at once, and fill and swell the imagination. It is thus carried away before the understanding, which is slow in its movements, can be properly exercised on the subject; and feigns, and supposes, and imagines what is unknown to be like those objects which have already got possession of the mind. It is thus that visionaries impose on themselves and on others; they are soaring away on mid-air with the wings of an eagle, when they ought to be digging with patient research in the mine of true knowledge.

Nothing is a more fruitful source of error among philosophers than that of expecting too much from the application of their intellectual powers. The mind of man is, of course, limited in its capabilities. We are surrounded with mysteries on every hand. We cannot move on in any line of thought, for any length of time, without soon finding ourselves encompassed with insurmountable difficulties. But the mind of some men cannot rest. It is continually shooting itself out, and pressing on, though to no purpose. Not knowing how or where to stop, it bewilders itself in seeking greater satisfaction respecting truths which lie far beyond the reach of its limited faculties.

The passions and affections also often lead us astray. The light of the understanding is not a pure or dry light, but is drenched in the will and affections; hence what men desire to be true, they are most easily inclined to believe. The understanding rejects things that are difficult, because it is impatient of inquiry; things just and solid, because they limit hope; the deeper mysteries of nature, through the influence of superstition; and the light of experience, through pride and haughtiness. Thus, in numberless ways, and sometimes in an almost imperceptible manner, the affections and propensities of men tinge and infect their understanding.

Too implicit confidence in the report of the senses, and drawing improper inferences from them, is another fruitful source of misconception and mistake. The objects of sense entirely engross our thoughts in the first part of life, and are most familiar

to us all our days. Hence the dulness, incompetency, and fallacies of the senses are very generally overlooked. Those things that strike the sense, unjustly overbalance those that do not; and little or no regard is paid to objects that lie beyond the reach of mere physical examination. We are thus led to judge of spiritual natures as we do of the material objects around us. Hence the human figure and human passions are very generally considered as belonging to the Supreme Being.

An undue fondness for abstraction, generalisation, and simplicity, is likewise the source of numerous prejudices. To this cause most of the errors of the ancient philosophy may be traced. The evidence which these theories had to support them was next to nothing; but their being reduced to a few simple, regular principles, supplied the place of proof, and obtained for them almost universal support. Thus the principle of gravitation was rejected by the greatest part of Europe for half a century, after Sir Isaac Newton had given the strongest proof of its existence in nature, because it could not be accounted for by matter and motion. Such, then, are the Idols of the Tribe, which belong to the whole human family. As these have their origin in the uniformity of the human mind, every person is in danger of them.

The second class of Idols in Lord Bacon's division consists of the *Idola Specus*. These are prejudices which have their foundation, not in the constitution of human nature, but, in something peculiar to the individual. They take their rise from the peculiar nature of each particular person, either with regard to mind or to body; and are produced by the education, customs, pursuits, and other accidental circumstances, that form the character. If any one were educated from his infancy in a dark cave till he were of full age, and should then of a sudden be brought into open day, and behold for the first time the wonders of the heavens and the earth, no doubt many absurd fancies, contracted in his seclusion, would still adhere to him, and lead him to erroneous conclusions. So is it with mankind; their minds are confined in the cavern of their bodies, which have each their own particular form, and particular manner of being enlightened; and these give false colours, and a delusive appearance, to the objects that are seen

in their twilight darkness.   In this way we receive the images of innumerable errors, and falsehoods, from which manifold prejudices spring up, and lead the understanding astray.

Men are fond of particular sciences and studies, either because they look upon them as their own, or, because they have bestowed much pains upon them, or have been peculiarly successful in their prosecution.   Their thoughts are thus confined to a certain track; and when they venture out of their beaten course, and apply themselves to any new pursuit, they generally wrest and corrupt it with their former conceits. They judge respecting any subject that comes before them by the maxims of their profession, however foreign these may be from the point in hand : thus they fall into error, and expose themselves to ridicule.   Mr Locke mentions an eminent musician who believed that God created the world in six days, and rested the seventh, because there are but seven notes in music. And Dr Reid mentions that the learned and ingenious Dr Henry More having very elaborately and methodically compiled his *Enchiridium Metaphisicum*, and *Enchiridium Ethicum*, found all the divisions and sub-divisions of both to be allegorically taught in the first chapter of Genesis.   Thus it is when Mathematicians apply to physics, medicine, or chemistry, they endeavour to render all these pursuits mathematical; when Chemists apply to physics, or medicine, they treat them as chemical; and when Divines apply to philosophy, they attempt to render all their investigations scriptural.

Thus it is that some men of genius are wrapped up in admiration of antiquity; others treat the ancients with contempt, and admire and value only that which is modern. Some are afraid to venture out of the common road; and their views, opinions, and principles, if they can be said to have any, are, like their clothes, cut according to the fashion; others are fond of singularity and paradoxes, and are never at rest except when indulging some strange conceit or new fancy. Some are desultory and changeable in their studies and opinions; others are too methodical and tenacious.   Some are so taken up with the particles of which things are composed, that they neglect their structure; while others view the fabrication of things with so much astonishment and attention, that they never enter into the simplicity of nature.   Both

these methods of study ought to be taken by turns, that the understanding may be at once rendered more piercing and more capacious. All these peculiarities, resulting from the circumstances of the individual, shut him up as it were in a den, and prevent him from taking clear and comprehensive views of the objects presented to his notice. Hence the fanciful name given to the prejudices that are thus formed. If, therefore, we would dislodge the idols that are produced in this way, and which reign in this dark cavern, we must come out into open day ;—we must seek truth, not in the seclusion of our own minds, but in the wide world that is open before us.

The next class of prejudices includes those denominated *Idola Fori.* These are the prejudices peculiar to the market-place, which have their origin in the imperfection of language. In all places of public resort, or wherever the general intercourse of mankind is carried on, words are used in a lax and capricious sense ; hence they are ever ready to mislead and deceive. This is, perhaps, the most prolific source of prejudice. Misconceptions insinuate themselves into the mind from the association of words and terms. Men generally believe that their reason governs words ; but it often happens that words retort, and reflect their force upon the understanding ; and this becomes the source of numerous errors. Words are generally imposed according to vulgar conceptions, and must, therefore, have many imperfections,—specially when applied to philosophy and the sciences. Most of the serious controversies of learned men terminate in disputes about the meaning of words. Mr Locke, in his Essay on the Human Understanding, found it necessary to occupy a great portion of his admirable work in pointing out the various kinds of words, their imperfections, abuses, and remedy. Almost every treatise on philosophy must begin by defining and explaining the terms that are to be employed. But even these definitions do not altogether meet the wants of the case, or remedy the evil ; for the definitions themselves consist of words, which, in some circumstances, may deceive as much as those for which they are substituted.

The idols which words impose on the understanding, Lord Bacon classes under two heads,—the names of things that

have no existence, and the names of things that do exist. Of the former he mentions the *primum mobile*, the orbs of the planets, the element of fire, and the like figments, which arise from imaginary and false theories. Many terms of this kind exist at the present day, such as *chance, fortune, nature*, which, having nothing corresponding to them in actual existence, are used in a vague indefinite sense, and often lead to serious error in judging and reasoning. As there are things which, through want of being observed, remain without names, so there are names coined which have no things corresponding to them ; and from this source many of the idols of the understanding have their origin. The other head includes those idols that are imposed upon us by words which are the names of actual existences, but which are confused, ill-defined, and formed by a rash and unskilful abstraction. Lord Bacon selects the word *moisture* as an example, and endeavours to ascertain how far the things agree that are signified by this term, and shews that it is a confused sign for various particulars that cannot be reduced to one determined signification. Thus, moisture signifies—that which is indeterminable of itself and cannot fix—that which yields easily every way—that which readily divides and scatters itself—that which easily unites with itself and runs together—that which easily flows and is easily put in motion—that which readily sticks to another body and wets it—and that which is easily melted, or reduced from a solid to a liquid. Now, when this term comes to be employed, with an exception of some of the significations, flame will be moist ; with the exception of others, air is not moist ; with the exception of some others, fine powders and glass may be said to be moist. He, therefore, concludes that the notion conveyed by this term has been inconsiderately taken from water, and other common liquids, and has not been truly verified, or made to agree precisely with the thing which it signifies, before it was adopted. Much, therefore, remains to be done before the imperfections of language can be removed, and a sufficient copiousness and distinctness be given to the terms used both in philosophy and in common life. Whether this will ever be completely effected is more than problematic ; since, as long as our knowledge is imperfect, language, which is the instrument of thought, as well as

the means of communicating it, will also remain imperfect. It would appear, then, that the abuse and imperfections of language will ever need to be guarded against as one of the most fruitful sources of error.

The last class of prejudices contains those which Lord Bacon denominates *Idola Theatri.* These are the prejudices of fashion and authority, which spring from great names, or from following a master; which arise from the systems we adopt, or the sects which we have espoused. These, like the representations of the stage, are calculated to impose on us; hence the appellation they have received. Prejudices of this kind are neither founded in our nature, nor secretly insinuated into the understanding, but are openly palmed upon it by false theories, and perverted laws of demonstration. These false theories have ever abounded in the philosophical, political, and religious worlds; and they have this in common with dramatic representations, whence the prejudices thus derived have their name, that they are more neat, elegant, and pleasing, than the reality of human life. Those who invent these erroneous systems lay their foundation in some hasty deductions, and then fill up the system from their own invention and imagination. Thus a very pleasing theory may soon be reared, very wide indeed from the truth, but which may more powerfully strike the vulgar, and command assent, than any system founded in truth and nature. Thus the Cartesian philosophy is much more agreeable to read than the Newtonian;—just as the conjectures of a wild and vigorous imagination are much more imposing than the plain dictates of common sense.

Now, when any false system, either of philosophy, or politics, or religion, is received into the mind, it becomes the medium through which every other subject is contemplated. These objects thus acquire a different colour from what they have when beheld by a mind free from these conceits. A Stoic and an Epicurean; a Whig and a Tory; a Churchman and a Dissenter, will frequently take a very different view of the same subject; not only when it relates to their peculiar tenets, but when not at all connected with these peculiarities. Still these prejudices are more particularly seen in reference to their favourite sects or doctrines. Thus the zealous abettor

of some favourite theory, in any particular science, will not listen to any arguments that can be brought against it ; the political partisan is loud in the praises of his party, while he expects nothing good from those who are of a different opinion ; and the religious bigot will maintain the most egregious errors, merely because they are a part of the creed he has espoused ; and against those who only claim the same right of judging for themselves which he claims for himself, he will thunder all his impotent but malignant anathemas. Thus it happens also with regard to the numerous petty enmities that are continually taking place in the various circles of mercantile and domestic life.   The dislikes and partialities thus formed, are conveyed from one to another; those who have influence impart them to those who are in some way or other under their authority.   The destructive consequences to the peace of society, thus occasioned, cannot be calculated.

Such are the various sources of error which fill the mind with prejudices, and pervert our judgments and reasonings. The connexion which this subject has with the application of the Science of Reasoning must be at once obvious.   In many instances, although our arguments may be faultless, both as to the reasoning process, and the evidence on which they rest, if the mind be preoccupied with any of the prejudices enumerated above, we shall find it almost impossible to produce conviction.   Hence the necessity of dislodging these idols, and of seeking as much as possible to free the mind from their pernicious influence, both in searching after truth ourselves, and in endeavouring to communicate it to others.   To adopt the language of the great *Restaurator* of true science, "these several sorts of Idols are all of them to be solemnly and for ever renounced, that the understanding may be thoroughly purged and cleared ; for the kingdom of man which is founded in the sciences, can scarcely be entered otherwise than the kingdom of God—that is, in the condition of little children."

CHAPTER VI.

OF THE CONNEXION WHICH LOGIC HAS WITH GRAMMAR AND RHETORIC.

To every department of literature and science Logic bears a very intimate relation; but to none more so than to Grammar and Rhetoric. The former of these branches of study treats of the principles and structure of Language, and points out the purity, precision, and propriety that should obtain in words and sentences. Rhetoric advances a step further, and shews how we may best gain the object which discourse proposes to accomplish, whether that be to please or instruct, to convince or persuade. These two branches of study when united enable us to communicate our thoughts to others, either in speech or writing, with purity and precision, with force and elegance. It is evident, then, that they are intimately connected with Logic, which helps us to think, judge, and reason, with readiness and accuracy. If the terms which we employ are not clear and distinct; if we cannot easily discern wherein objects agree and disagree, and pronounce accordingly; and if the inferences deduced from these decisions are not drawn promptly and conclusively, it will matter little that grammatical purity and rhetorical elegance have been preserved. With these important studies, then, Logic should be associated, if we wish to reap, with the greatest advantage, the benefits which they are each intended to communicate.

Grammar may be looked upon as the introduction to logical pursuits; and though its office be not dignified, it is nevertheless of indispensable necessity. Without a knowledge of the rules and principles developed by the Grammarian, it is impossible to advance a step in the prosecution of logical inquiries with any hope of success. The various definitions, distinctions, and classifications, which lie at the very threshold of this Science, in many instances, belong almost as properly to the one study as to the other. Logic has for its object the laws of thought, in so far as the reasoning process is concerned; but as language is the medium of thought, and

as these two exert a mutual influence on each other, it is
necessary that language, in some degree, come under the con-
sideration of the logician.   Here, then, it is that Grammar
and Logic meet ; the one takes up, and prosecutes, and ap-
plies to its own use, what the other had previously prepared. ,
A knowledge of the principles and rules which have led to
the formation of artificial signs for the communication of
thought, and an acquaintance with the different classes of
such signs, with their various functions, combinations, and
accidents, must be valuable both in a speculative and prac-
tical point of view.   It was by considering speech and lan-
guage in this light that the science of Grammar was pro-
duced, which consists of two kinds, the one *popular*, the
other *philosophical.*   The former is intended to aid us in the
speedy and perfect acquirement of languages, so that we may
intelligibly communicate and understand the ideas which are
conveyed from one to another in the common intercourse of
society, whether by speech or by writing.   This branch of
Grammar, therefore, treats of the order, connexion, and de-
pendence of words, as laid down in rules of syntax and con-
struction ; and whoever enters on the study of Logic without
having previously made himself intimately acquainted with
the principles and rules there developed, undertakes a diffi-
cult, if not an impracticable task.   But that part of Grammar
which has been styled *philosophical,* moves in a higher sphere.
It is employed in examining the nature and powers of words ;
and its office is to enter into the philosophy of language.   It
is when taken in this latter sense that Grammar is seen to be
most intimately connected with Logic.   The first part of
Logic, which treats of terms, enters deeply into the philosophy
of language.   Much depends, in every process of argumenta-
tion, on the mere verbal part of the argument ; and, in so far
as this is concerned, the labours of the Grammarian and the
Logician very nearly coincide.   But, properly speaking, the
former prepares the way for the latter, introduces him to the
right path, and removes many obstacles that would materially
impede him in prosecuting his journey.
    As Grammar may be considered the introduction, so Rhe-
toric is merely an extension of this Science.   The object
which Logic and Rhetoric propose to accomplish is in some

respects the same, since they are both intended to produce conviction by a process of reasoning. But the manner in which they accomplish this end is different. The Logician has his premises laid before him, and his office is to draw a conclusion from them : on the other hand, the Rhetorician has the conclusion given, and his object is to seek for arguments by which it may be established. The one is the Advocate, who has to exert his talent and ingenuity to find arguments to support the cause he has espoused ; the other is the Judge, who has to determine whether these arguments are valid or not. The subject-matter of both may be the same ; and, in so far as the bare process of reasoning extends, that is, of course, also the same in both. But Rhetoric proceeds further than the mere process of reasoning. It has to invent arguments ; to find out those that are most suitable for the matter in hand ; to arrange them in their proper order ; and so to state and enforce them, as shall be most likely either to illuminate the understanding, please the imagination, influence the will, or move the passions. It is evident, then, although these two branches of study are intimately connected, that the one advances much further than the other. As an acquaintance with Grammar is necessary before we can properly enter on the study of Logic, so a knowledge of Rhetoric is essential to the successful application of Logic to practical purposes. These three branches of study, therefore, naturally follow each other in the order we have specified, and tend mutually to aid and perfect each other.

It appears, then, from what has now been advanced, that Method, although generally brought forward as a distinct part of Logic, and dignified with the name of a *logical instrument,* belongs more properly to Rhetoric than to Logic. By *method,* as it is explained, we are to understand the arrangement of our thoughts in such a manner as shall best aid the mind in the acquisition or communication of knowledge. It includes more than mere order. It is such a disposition of our mental stores as may lead to their increase, or to their most efficient application ; it is such an arrangement of our thoughts, on any particular subject, as may lead us most easily, and speedily, and safely, from one branch of it to another, till we ultimately obtain a clear and adequate acquaintance with the whole.

The utility of such an instrument no one will deny.   It will preserve the mind from confusion and mistake, and greatly facilitate our attempts both to acquire and impart information. We are far, then, from depreciating the rules that have been laid down on this subject, and which are generally given in works on Logic, as a fourth part of the system. But as *method* is perfectly distinct from the *reasoning process*, and is subservient more especially to the art of communication, we prefer assigning it to Rhetoric, to which branch of study it seems properly to belong.   This will more evidently appear if we glance, for a moment, at the two principal divisions of method, the Analytic and the Synthetic.

By the Analytic Method we arrive at the knowledge of a subject by taking it as a whole, and resolving it into its compotent parts.   The procedure in this case is from generals to particulars, from a whole to its parts, from effects to their causes. This method is employed, not so much in the arrangement and classification of known truths, as in the search after those that are not yet clearly ascertained.   It has, therefore, been called the *method of invention,* because it observes the order in which our minds are employed in the invention or discovery of truth.   The Synthetic Method is just the reverse of this. We here begin with the elementary parts of a subject, and, by putting them together, we trace them up till we ascertain what it is as a whole.   In this case the process is from the simple to the compound, from the parts to the whole, from causes to effects.   This has been called the *method of instruction,* because it is most commonly employed in explaining and communicating knowledge to others. These two methods, then, have evidently a special reference to the business of the Rhetorician.   By the one he ·*invents* his arguments ; by the other he *arranges* them so that he may most effectually instruct, persuade, or excite those whom he addresses.   The rules that have been laid down respecting Method, and those relating to the writing of *themes,* and the conducting of *disputations,* which are generally given in connexion with it, we therefore hand over to the Rhetorician, since they belong more properly to his Art, than to our Science.

APPENDIX I.

CONSECUTIVE EXERCISES.

EXERCISE I.

EXPLAIN the distinction in the following pairs of terms :—

James,	Mortality,	The hero of Waterloo,
Boy.	Mortal.	Wellington.
White,	Hard,	Silence,	Incorporeal,
Cold.	Soft.	Speech.	Corporeal.
Attract,	Preceptor,	The Capital of England,
Repel.	Pupil.	London.
Bucephalus,	Fear,	Beautiful,	Bad.
Horse.	Despair.	Beauty.	Good.
Whiteness,	Virtuous,	Wealthy,	Length,
White.	Poor.	Poor.	Long.

EXERCISE II.

Specify the relations which the following terms sustain to each other :—

Juice,	Metal,	Rose,	Tool,	Book,
Wine.	Iron.	Flower.	Saw.	Folio.
Snow,	Stream,	Feathered,	Blood,	Liquid,
White.	Slow.	Bird.	Red.	Juice.

Wine,	Figure,	Rectangle,	Water,	Ice.
Claret.	Square.	Square.	Hot.	Cold.
Animal,	Lion,	Mastiff,	Clay,	Justice,
Substance.	Animal.	Dog.	Hard.	Virtue.

EXERCISE III.

Point out which of the following divisions are logical, and which are physical; and specify when and wherein the rules of division are violated :—

A plant may be divided into—root, buds, stalk, leaves, flower, fruit, &c.

The stalks of plants are divided into—the caulis, calmus, scapus, pedunculus, petiolus, frons, and stipes.

A flower may be divided into—the calyx, corolla, stamina, pistils, &c.

Animals are divided into — mammalia, aves, amphibia, pisces, insecta, vermes.

Natural history is divided into three kingdoms,—the animal, mineral, and vegetable.

Earths are divided into—lime, alumina, potter's clay, silicia, flint, &c.

Rocks are divided into the following formations—alluvial, transition, primitive, volcanic.

Rocks are divided into—primitive, siliceous, argillaceous, transition, floetz, stratified, alluvial, volcanic, granite, slate, trap, basaltes, &c.

EXERCISE IV.

Point out the *genus* and *difference* in the following definitions :—

A magnet is an iron-ore having attraction for iron.

A dragon is an animal breathing fire.

Architecture is the art of building.

A triangle is a three-sided figure.

Laurel-water is a liquor distilled from laurel-leaves.

Gold is the heaviest metal.
Alexander was the greatest of Conquerors.

EXERCISE V.

Define by *genus* and *difference* the following terms :—

A Meadow.	Honesty.	Parallelogram.
An Island.	Slavery.	Centaur.
A Captain.	Bigotry.	Serpent.
A Phœnix.	Money.	Fish.

EXERCISE VI.

Specify the *subject, predicate,* and *copula* in the following propositions :—

Time is infinitely precious.   Great is the work of life.
Exercise is beneficial.   He is present.
He is walking.   Walking is pleasant.
" Sweet is the breath of the morn."
Not to improve is to grow worse.
I hope to succeed.   Miserable is the slave.
The British conquered.   Conscience condemns him.
It is criminal to put to death an innocent man.
The impertinence of conceit is unworthy of notice.

EXERCISE VII.

How are propositions distinguished as *sentences?*
Give examples of *categorical* and *hypothetical* propositions.
How are propositions distinguished as to their *form?*
Give examples of *pure* and *modal* propositions.
How are propositions distinguished as to their *matter?*
Give examples of *true* and *false* propositions.

How are propositions distinguished as to their *quality* and *quantity?*

Give examples of *affirmative* and *negative,* and of *universal* and *particular* propositions.

EXERCISE VIII.

Distinguish by their appropriate symbols the following propositions; and explain in which the subject is distributed, and in which the *predicate :—*

All men are mortal.   Solomon was wise.
Birds have wings.   Birds are not carnivorous.
Some men are wicked.   No man is perfect.
Sin is no trifle.   Some beasts are not bipeds.
Every vice is hurtful.   The contented only are happy.

EXERCISE IX.

Describe and illustrate by examples *Subalternation.*

Describe the three kinds of *Conversion ;* and convert legitimately the propositions given as examples in Exercise VIII.

Describe the three kinds of *Opposition ;* and state the maxims thence deduced.

EXERCISE X.

Point out the *major, middle,* and *minor terms ;* and the *major* and *minor premises,* in the following Syllogisms :—

All predacious animals are carnivorous :
The tiger is a predacious animal ; therefore,
The tiger is carnivorous.

Some who are rich are penurious :
None who are penurious are happy ; therefore,
Some who are rich are not happy.

Every A is B :   All X is Y :
Every C is A ; therefore,   All Y is Z ; therefore,
Every C is B.   All X is Z.

EXERCISE XI.

Explain why the following apparent Syllogisms are faulty :—

Some animals are beasts :
Some animals are birds ; therefore,
Some birds are beasts.

Some A is B :
Some A is C ; therefore,
Some C is B.

Every rational being is accountable :
A brute is not a rational being ; therefore,
A brute is not accountable.

All serpents have stings :
All serpents are animals ; therefore,
All animals have stings.

All A is B :   No A is B :
All C is B ; therefore,   No C is B ; therefore,
All C is A.   No C is A.

EXERCISE XII.

State in what figure the following Syllogisms respectively
are :—

All A is B :   No A is B :
All C is A ; therefore,   Every C is A ; therefore,
All C is B.   No C is B.

Every A is B :   Every A is B :
No C is B ; therefore,   Every A is C ; therefore,
No C is A.   Some C is A.

N

Whatever is expedient is conformable to nature :
Whatever is conformable to nature is not hurtful to
    society ; therefore,
What is hurtful to society is never expedient.

––––––––

Exercise XIII.

Name the moods of the Syllogisms given in the preceding
exercise.
Explain on what grounds the following moods are inad-
missible :—

A, O, A.	E, O, O.	I, A, A.	O, E, O.
A, E, A.	E, E, E.	I, A, E.	O, A, A.
A, O, E.	E, I, I.	I, E, O.	O, A, E.
A, I, A.	E, I, A.	I, O, O.	O, E, A.

––––––––

Exercise XIV.

Explain in what figures the following moods are admis-
sible :—

A, A, A.	E, A, E.
A, O, O.	E, I, O.
A, A, I.	E, A, O.
A, E, E.	I, A, I.
A, I, I.	O, A, O.

––––––––

Exercise XV.

Reduce the following Syllogisms from an *imperfect* to a
perfect mood :—

No savages have the use of metals :
The ancient Germans had the use of metals ;
    therefore,
They were not savages.

Every A is B :	Every A is B :
No C is A ; therefore,	Some A is C ; therefore,
No C is B.	Some C is B.

All wise men subdue their passions :
Some learned men do not subdue their passions ;
   therefore,
Some learned men are not wise.

Every A is B :	All A is B :
No B is C ; therefore,	All B is C ; therefore,
No C is A.	Some C is A.

All diamonds consist of carbon :
All carbon is combustible ; therefore,
Some combustible substances are diamonds.

EXERCISE XVI.

Point out the *antecedent,* the *consequent,* and the *consequence,* in each of the following conditional propositions :—

   If this man is a thief, he deserves punishment.
   If the Pope be infallible, he must be inspired.
   The husbandman is well off if he knows his own
     advantages.
   Logic should be neglected if it is useless.
   Misery will increase if the population increases.

What follows if you admit the antecedent ?
What follows if you reject the consequent ?
State the two rules on which conditional syllogisms depend ; and give an example of a Constructive, and of a Destructive conditional syllogism.

EXERCISE XVII.

Give examples of a disjunctive proposition.
Of what does a disjunctive proposition consist ?
When is a Syllogism disjunctive ?

Give examples of disjunctive syllogisms having their conclusion *categorical.*

Give examples in which the conclusion will be *disjunctive.*

Reduce the following hypothetical Syllogisms to the categorical form :—

> If Logic is useful, it deserves to be studied :
> But it is useful ; therefore,
> It deserves to be studied.

> If the potato crop fail, the price of corn will rise :
> But the potato crop has failed ; therefore,
> The price of corn will rise.

EXERCISE XVIII.

Enumerate the Irregular Syllogisms.

Give examples of the Enthymeme ; and mention the rules for supplying the suppressed premise.

Draw out the following Sorites into regular consecutive Syllogisms :—

> A popular orator is a favourite with the populace ;
> He who is a favourite with the populace must know how to manage them ;
> He who knows how to manage them must well understand their weaknesses ;
> He who well understands their weaknesses must hold them in contempt ; therefore,
> A popular orator must hold the populace in contempt.

EXERCISE XIX.

State the following arguments in the form of the Dilemma :—

> There are two kinds of things about which we ought not to fret : what we can help, and what we cannot help.

For those who are bent on cultivating their minds by diligent study, the incitement of academical honours is unnecessary; for such as are idle and indifferent to mental improvement, it is ineffectual.

If the blessed in heaven have no desires, they will be perfectly content; they will be equally so, if their desires are fully gratified.

If the prophecies of the Old Testament had been written without knowledge of the events of the time of Christ, they could not correspond with them exactly; and if they had been forged by Christians, they would not be preserved and acknowledged by the Jews:—they are preserved and acknowledged by the Jews, and they correspond exactly with the events of the time of Christ: what then?

EXERCISE XX.

Explain, and give examples of, the Epichirema.

Explain what is meant by Induction.

State the following arguments in a syllogistic form :—

Mercury, Venus, the Earth, Mars, &c. move in elliptical orbits round the sun; therefore, all planets do so.

Sheep, oxen, deer, and other animals deficient in upper cutting-teeth, ruminate; therefore, all such do so.

Philip, Alexander, Julius Cæsar, Augustus, Napoleon, and other great warriors, were reckless of human life; therefore, all great warriors are so.

APPENDIX II.

MISCELLANEOUS EXERCISES.

In the following examples, let such as are not in the syllogistic
form, be reduced to that form, when the reasoning is in itself
sound. Let such as are apparent Syllogisms have their validity
tried by logical rules, which may be applied in the following
order :—

1st, Observe whether the argument be Categorical or Hypo-
thetical; recollecting that a hypothetical premise does not
necessarily imply a hypothetical Syllogism, unless the reason-
ing turns on the hypothesis. If this appear to be the case, the
rules for hypothetical Syllogisms must be applied.

2d, If the argument be categorical, count the terms.

3d, If there are only three terms, observe whether the
middle term be distributed.

4th, Observe whether the premises are both negative—
that is, really so, and not in appearance only; and if one is,
whether the conclusion be negative also; or affirmative, if both
premises are affirmative.

5th, Observe what terms are Distributed in the Conclusion,
and whether the same are Distributed in the Premises.

6th, If the Syllogism is not a Categorical in the first Figure,
reduce it to that form.

1. Man, by worshipping, becomes assimilated to the
   moral character of the object that he worships :
   The God of the Bible, as manifested in Christ Jesus, is
   the only perfectly righteous and perfectly benevolent
   being ever worshipped by man ; therefore,
   Man can become righteous and benevolent in no other way
   but by that worship which will assimilate him to the
   God of the Bible.
2. No one is happy who is not wise : no fool is wise ;
   therefore, no fool is happy.
3. No one is free who is enslaved by his appetites : a sen-
   sualist is enslaved by his appetites; therefore, a sen-
   sualist is not free.

4. Every honest man attends to his business : this person attends to his business ; therefore, he is an honest man.

5. All jealous persons are miserable : this person is not jealous ; therefore, he is not miserable.

6. No man can possess power to perform impossibilities : a miracle is an impossibility ; therefore, no man can possess power to perform a miracle.

7. A is less than B : B is less than C ; therefore, A is less than C.

8. All weak princes are prone to favourites : this prince is prone to favourites ; therefore, he is a weak prince.

9. If virtue is voluntary, vice is voluntary : virtue is voluntary ; therefore, so is vice.

10. Every change is agreeable : death is a change ; therefore, death is agreeable.

11. None but Whites are civilised : the Hindoos are not Whites ; therefore, they are not civilised.

12. No one who lives with another on terms of confidence is justified, on any pretence, in killing him : Brutus lived on terms of confidence with Cæsar ; therefore, he was not justified, on the pretence he pleaded, in killing him.

13. He that destroys a man who usurps despotic power in a free country, deserves well of his countrymen : Brutus destroyed Cæsar, who usurped despotic power in Rome ; therefore, he deserved well of the Romans.

14. A B and C D are each of them equal to E F ; therefore, they are equal to each other.

15. He who is most hungry eats most : he who eats least is most hungry ; therefore, he who eats least eats most.

16. If the taking of Oczakoff was an adequate motive for hostilities, the war ought to be *continued ;* if not, it ought not to have been *commenced :* either it was an adequate motive, or it was not ; therefore, &c.

17. Meat and drink are necessaries of life : the revenues of Vitellius were spent on meat and drink ; therefore, the revenues of Vitellius were spent on the necessaries of life.

18. Nothing is heavier than Platina : feathers are heavier than nothing ; therefore, feathers are heavier than Platina.

19. Some poisons are vegetable : no poisons are useful drugs ; therefore, some useful drugs are not vegetable.

20. If the hour-hand of a clock be any distance (suppose a foot) before the minute-hand, this last, though moving twelve times faster, can never overtake the other ; for while the minute-hand is moving over those twelve inches, the hour-hand will have moved over one inch ; so that they will then be an inch apart : and while the minute-hand is moving over that one inch, the hour-hand will have moved over $\frac{1}{12}$ inch, so that it will still be a-head ; and again, while the minute-hand is passing over that space of $\frac{1}{12}$ inch which now divides them, the hour-hand will pass over $\frac{1}{144}$ inch ; so that it will still be a-head, though the distance between the two is diminished, &c., &c., &c. ; and thus it is plain we may go on for ever ; therefore, the minute-hand can never overtake the hour-hand.

21. A man must possess faith to be acceptable to God : he who believes the fables of the Hindoo mythology must possess faith ; therefore, such a one must be acceptable to God.

22. Calvinists are Christians : Arminians are Christians ; therefore, Arminians are Calvinists.

23. Animal-food may be entirely dispensed with, (as is shewn by the practice of the Brahmins ;) and vegetable-food may be entirely dispensed with, (as is plain from the example of the Esquimaux ;) but all food consists of animal-food and vegetable-food ; therefore, all food may be dispensed with.

24. Those who work hard deserve reward : those who work on the tread-mill work hard ; therefore, those who work on the tread-mill deserve reward.

25. Theft is a crime : theft was encouraged by the laws of Sparta ; therefore, the laws of Sparta encouraged crime.

26. All cold is to be expelled by heat : this person's dis-

temper is a cold ; therefore, it is to be expelled by heat.

27. Repentance is a good thing : wicked men abound in repentance ; therefore, wicked men abound in what is good.

28. Every one desires happiness : virtue is happiness ; therefore, every one desires virtue.

29. If penal laws against Roman Catholics were enforced, they would be aggrieved : but penal laws against them are not enforced ; therefore, they are not aggrieved.

30. The reading of the Scriptures is liable to abuse ; therefore, the reading of the Scriptures should be discouraged.

31. Human bodies as they grow old decay ; therefore, political bodies as they grow old will decay.

32. This country is distressed ; therefore, it is misgoverned.

33. A person infected with the plague will (probably) die [suppose 3 in 5 of the infected die :] this man is (probably) infected with the plague [suppose it an even chance ;] therefore, he will (probably) die. Query. What is the amount of this probability ?

34. No evil should be allowed that good may come of it : all punishment is an evil ; therefore, no punishment should be allowed that good may come of it.

35. Poppies have a soporific tendency ; therefore, they induce drowsiness.

36. Nature abhors a vaccum ; therefore, water rises in a pump.

37. He who believes his opinion always right deems himself infallible : you always believe your opinion right ; therefore, you deem yourself infallible.

38. If any complete theory could be framed to explain the establishment of Christianity by human causes, such a theory would have been proposed before now : but none such has ever been proposed ; therefore, no such theory can be framed.

39. A theory will speedily be exploded, if false, which appeals to the evidence of observation and experiment ;

therefore, if Phrenology be a false theory, it will speedily be exploded.

40. All that glitters is not gold : tinsel glitters ; therefore, it is not gold.

41. A negro is a man; therefore, he who murders a negro murders a man.

42. The heart in the animal body may be too large : a metropolis is the heart of a country; therefore, a metropolis may be too large.

43. Misletoe of the oak is a vegetable excrescence which is not a plant : and every vegetable excrescence which is not a plant is possessed of magical virtues ; therefore, misletoe of the oak is possessed of magical virtues.

44. A monopoly of the sugar-refining business is beneficial to sugar-refiners : and of the corn-trade to corn-growers : and of the silk-manufacturers to silk-weavers, &c., &c., &c. Thus each class of men is benefited by some restrictions. But all these classes of men make up the whole community ; therefore, a system of restriction is beneficial to the community.

45. No man ought to withhold his property from another : this sword is that madman's property ; therefore, no one ought to withhold it from him.

46. Lias lies above Red Sandstone : Red Sandstone lies above Coal ; therefore, Lias lies above Coal.

47. The testimony of *this* witness is insufficient to prove the fact alleged—so is the testimony of *that* witness—and so of the *other :* but we believe the fact on the testimony of this, that, and the other witness ; therefore, we believe the fact on insufficient testimony.

48. Pearls are obtained by laborious diving ; therefore, they command a high price.

49. A Jew, Mahometan, or Roman Catholic, is not the most eligible person to hold office in a Protestant-Christian country : these persons belong to these persuasions ; therefore, they ought not to be legally eligible.

50. Any one who is candid will refrain from condemning a book which he has not read : some reviewers do not refrain from this ; therefore, some reviewers are not candid.

APPENDIX III.

PRAXIS OF LOGICAL ANALYSIS.

As the Rules of Logic apply to arguments only after they have been exhibited at full length in the bare elementary form, it may be useful to subjoin some remarks on the mode of analysing and reducing to that form any train of argument that may be presented to us; since this must in general be the first step taken in an attempt to apply logical rules.

First, then, of whatever length the reasoning may be, whether treatise, chapter, or paragraph, begin with the concluding assertion;—not necessarily the last sentence expressed, but the last point established;—and this, whether it be formally enunciated, or left to be understood. Then, tracing the reasoning backwards, observe on what ground that assertion is made. The assertion will be your Conclusion; the·ground on which it rests, your Premises. The whole Syllogism thus obtained may be tried by the rules of Logic.

If no incorrectness appear in this Syllogism, proceed to take the premises separately, and pursue with each the same plan as with the conclusion you first stated. A premise must have been used as such, either because it required no proof, or because it had been proved. If it have not been proved, consider whether it be so self-evident as to have needed no proof. If it have been proved, you must regard it as a conclusion derived from other assertions which are premises to it: so that the process with which you set out will be repeated ; ˙viz., to observe on what grounds the assertion rests, to state these as premises, and to apply the proper rules to the syllogism thus obtained. Having satisfied yourself of the correctness of this, proceed, as before, to state its premises, if needful, as conclusions derived from other assertions. And thus the analysis will go on (if the whole chain of argument be correct) till you arrive at the premises with which the whole commences ; which of course should be assertions requiring no proof : or, if the chain be anywhere faulty, the analysis
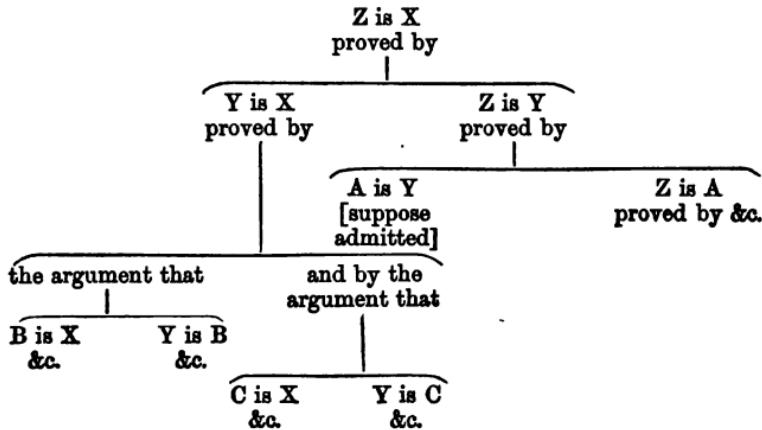
will proceed till you come to some proposition, either assumed as self-evident, though requiring proof, or incorrectly deduced from other assertions.*

It will often happen that the same assertion will have been proved by many different arguments; and then, the inquiry into the truth of the premises will branch out accordingly. In mathematical or other demonstrative reasoning, this will of course never take place, since absolute certainty admits of no increase; and if, as is often the case, the same truth admits of several different denominations, we select the simplest and clearest, and discard the rest. But in *probable* reasoning there is often a Cumulation of arguments, each proving the same conclusion; *i.e.*, each proving it to be *probable*. In such cases, therefore, you will have first to try each argument separately; and should each of them establish the conclusion as in some degree probable, you will then have to calculate the *aggregate* probability.

In this calculation Logic only so far assists as it enables us to place the several *items* of probability in the most convenient form. As the degree of probability of each proposition that is originally *assumed* is a point to be determined by the rea-

---

* Many students probably will find it a very clear and convenient mode of exhibiting the logical analysis of a course of argument, to draw it out in the form of a Tree, or Logical Division: thus,

[Ultimate Conclusion.]

Z is X
proved by

Y is X proved by   Z is Y proved by

A is Y [suppose admitted]   Z is A proved by &c.

the argument that   and by the argument that

B is X &c.   Y is B &c.

C is X &c.   Y is C &c.

soner's own sagacity and experience as to the matter in hand, so, the degree of probability of each *conclusion*, (given, that of each of its premises,) and also the *collective* probability resulting from several different arguments all tending to the same conclusion, is an *arithmetical* question. But the assistance afforded by logical rules in clearly stating the several items so as to prepare the way for the other operations, will not be thought lightly of by any who have observed the confusion of thought and the fallacy, which have often been introduced through the want of such a statement.

Example of Analysis applied to the first part of Paley's Evidences.

The ultimate Conclusion, that "The Christian Religion came from God," is made to rest (as far as "the direct historical evidence" is concerned) on these two premises; That "A Religion attested by Miracles is from God;" and that "The Christian Religion is so attested."

Of these two premises it should be remarked, the Minor seems to have been admitted, while the Major was denied, by the unbelievers of old : whereas at the present day the case is reversed.

Paley's argument therefore goes to establish the Minor premise, about which alone, in these days, there is likely to be any question.

He states with this view, two propositions : viz.

PROP. I.—" That there is satisfactory evidence, that many, professing to be original witnesses of the Christian miracles, passed their lives in labours, dangers, and sufferings, voluntarily undergone in attestation of the accounts which they delivered, and solely in consequence of their belief of those accounts ; and that they also submitted, from the same motives, to new rules of conduct."

PROP. II.—" That there is NOT satisfactory evidence, that persons pretending to be original witnesses of any other similar miracles, have acted in the same manner, in attestation of the accounts which they delivered, and solely in consequence of their belief of the truth of those accounts."

Of these two propositions, the latter, it will easily be per-

ceived, is the Major premise, stated as the *converse by Negation* of a universal affirmative : the former proposition is the Minor.

As a Syllogism in *Barbara*, therefore, the whole stand thus :—

" All miracles attested by such and such evidence, are worthy of credit :" (by conversion, " none which are not worthy of credit are so attested.")

" The Christian miracles are attested by such and such evidence ;" therefore, " they are worthy of credit."

The Minor premise is first proved by being taken as *several* distinct ones, each of which is separately established.

I. It is proved that the first propagators of Christianity *suffered ;* by shewing,

1st, *A priori,* from the nature of the case, that they were *likely* to suffer : [because they were preachers of a religion unexpected and unwelcome : first, to the Jews, and second, to the Gentiles.]

2d, From *profane testimony.*

3d, From the testimony of *Christian Writings.* [And here comes in the proof of one of the premises of this last argument ; viz., the proof of the credibility, *as to this point* at least, of the Christian Writings.]

These arguments are *cumulative ; i.e.,* each separately goes to establish the probability of the one common conclusion, that " the first propagators of Christianity *suffered.*"

By similar arguments it is shewn that their sufferings were such as they *voluntarily* exposed themselves to.

II. It is proved that, " What they suffered *for* was a *miraculous* story :" by

1st, The nature of the case ; they could have had nothing but miracles on which to rest the claims of a new religion.

2d, By allusions to miracles, particularly to the Resurrection, both in Christian and in Profane Writers, as the evidence on which the religion rested.

The same course of argument goes to shew that the miracles in attestation of which they suffered were such as they professed to have *witnessed.*

These arguments again are cumulative.

III. It is proved, that " The miracles thus attested are

what we call the *Christian* miracles ;" in other words, that
the story was, in the main, that which we have now in the
Christian Scriptures ; by

1st, The nature of the case ; viz., that it is improbable the
original story should have completely died away, and a sub-
stantially new one have occupied its place ;

2d, By the incidental allusions of ancient writers, both
Christian and profane, to accounts agreeing with those of our
Scriptures, as the ones then received ;

3d, By the credibility of our Historical Scriptures : this is
established by several distinct arguments, each separately
tending to shew that these books were, from the earliest ages
of Christianity, well known and carefully preserved among
Christians : viz.,

1. They were *quoted* by ancient Christian writers
2. with peculiar *respect.*
3. Collected into a *distinct volume,* and
4. distinguished by appropriate names and *titles* of *respect.*
5. *Publicly read* and expounded, and
6. had *commentaries,* &c., written on them.
7. Were received by Christians of *different Sects ;* &c., &c.

The latter part of the first main proposition branches off
into two ; viz., 1st, That the early Christians submitted to
new *rules of conduct ;* 2d, That they did so, *in consequence* of
their belief in miracles wrought before them.

Each of these is established in various parts of the above
course of argument, and by similar premises ; viz., the nature
of the case,—the accounts of heathen writers,—and the testi-
mony of the Christian Scriptures, &c.

The Major premise, that " Miracles thus attested are
worthy of credit," (which must be combined with the former,
in order to establish the conclusion, that " the Christian
miracles are worthy of credit,") is next to be established.

Previously to his entering on the second main proposition,
(which I have stated to be the converse by negation of this
Major premise,) he draws his conclusion (Ch. X., Part I.) from
the Minor premise, in combination with the Major, resting the
Major on

1st, The *a priori improbability* that a false story should

have been thus attested; viz., "If it be so, the religion must be true.*   These men could not be deceivers.   By only not bearing testimony, they might have avoided all these sufferings, and have lived quietly.   Would men in such circumstances pretend to have seen what they never saw; assert facts which they had no knowledge of; go about lying to teach virtue; and, though not only convinced of Christ's being an impostor, but having seen the success of His imposture in His crucifixion, yet persist in carrying it on; and so persist, as to bring upon themselves, for nothing, and with a full knowledge of the consequence, enmity, and hatred, danger and death?"

2d, That no *false* story of Miracles is *likely* to be so attested, is again proved, from the premise that "no false story of miracles ever *has been* so attested;" and this premise again is proved in the form of a proposition, which includes it; viz., that " No *other* miraculous story *whatever* is so attested."

This assertion again, *bifurcates;* viz., it is proved respecting the several stories that are likely to be, or that have been adduced, as parallel to the Christian, that either

1. They are not so *attested;* or,

2. That they are not properly *miraculous;* i.e., that admitting the veracity of the narrator, it does not follow that any miracle took place; as in cases that may be explained by *false perceptions—accidents,* &c.

In this way the learner may proceed to analyse the rest of the work, and to fill up the details of those parts of the arguments which I have but slightly touched upon.

It will be observed that, to avoid unnecessary prolixity, I have in most of the above Syllogisms suppressed one premise, which the learner will be able easily to supply for himself. *e.g.,* In the early part of this analysis it will easily be seen that the first of the series of cumulative arguments to prove that the propagators of Christianity did suffer, would at full length stand thus:—

* This is the *ultimate* conclusion deduced from the premise, that "it is attested by real *Miracles:* which, in the present day, comes to the same thing: since those for whom he is writing are ready at once to admit the truth of the *religion,* if convinced of the reality of the *miracles.*   The ancient Jews were not."

"Whoever propagated a religion unwelcome to the Jews
    and to the Gentiles, was likely to suffer :
The Apostles did this ; therefore,
They were likely to suffer," &c.

It is also to be observed, that the same proposition used in
different Syllogisms may require to be differently expressed by
a substitution of some *equivalent,* in order to render the argu-
ment, in each, *formally* correct. This of course is always
allowable, provided great care is taken that the exact meaning
be preserved: *e.g.,* if the proposition be, "The persons who
attested the Christian miracles underwent sufferings in at-
testation of them," I am authorised to state the same asser-
tion in a different form, thus, "The Christian miracles are
attested by men who suffered in attestation of their reality,"
&c.

Great care, however, should be used to avoid being misled
by the substitution of one proposition for another, when the
two are not (though perhaps they sound so) really equivalent,
so that the one warrants the assumption of the other.—
Whately's Logic.

THE END.
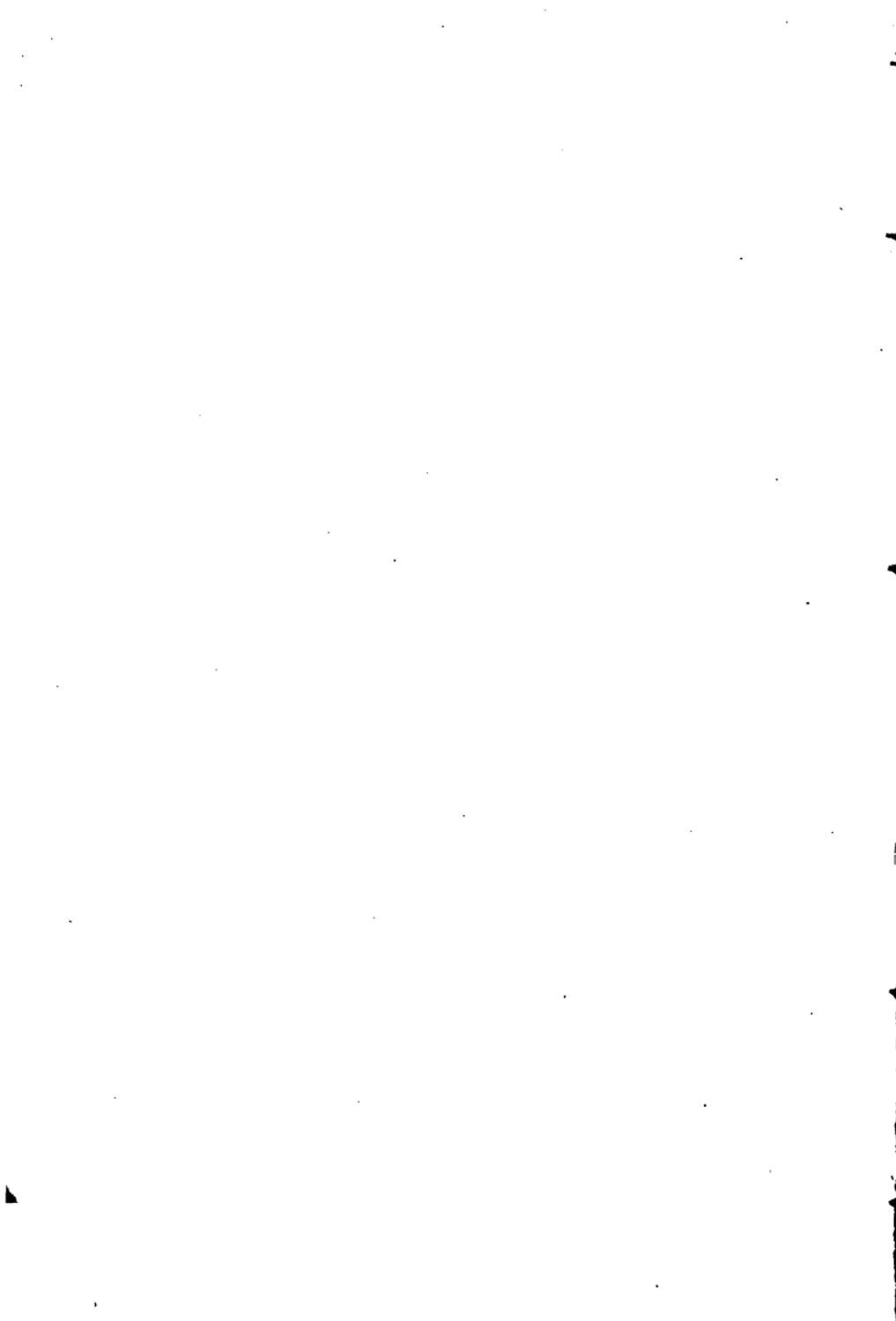
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